

A Bridge between the 5th and 6th Waves of Innovation: Reputational Regulation, the Petroleum Industry and Energy Transition

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Abstract

The objective of this study is to discuss reputational regulation, its key features, its limitations and how it is connected to energy transition, affecting both the Petroleum industry and government behaviors. The article is grounded mainly in scholarly literature from law and economics and regulatory law and places them in the perspective of ESG and energy transition literature. The main methodology adopted for this study was review and discussion of scholarly work and the results obtained indicate that, although very briefly discussed in the past, in the context of Information and Communication Technologies (ICT) and energy transition, the theory of reputational regulation becomes more relevant, as it clearly impacts both the Petroleum industry and government behaviors. The implications of this study are significant for scholars, policymakers and private agents in the energy sector. The mechanics of energy regulation, particularly regarding the Petroleum industry, must consider reputational regulation as it affects the relationship between the public opinion, industry and policy makers, involving public and private interest. This study contributes to literature by highlighting for the first time the growing relevance of reputational regulation using the connection between ICT, energy transition and Petroleum industry.

Keywords

ICT, Reputational Regulation, Petroleum Industry, Energy Transition

1. Introduction

The theory of waves of innovation was proposed by Kondratieff & Stolper (1935) and expanded by Schumpeter (1939). Waves of innovation are long-term cycles

of economic development driven by major technological breakthroughs and societal transformations.

According to such theory, until 2020, society has faced a total of 5 waves of innovation:

- 1) 1st wave (1780s): the Industrial Revolution (steam engine).
- 2) 2nd wave (1870s): railroads and steel production.
- 3) 3rd wave (1930s): electricity and chemicals.
- 4) 4th wave (1950s): automobiles, aviation, and mass production.

From the 70s to the early 21st century, society went through the 5th wave of innovation, which is the rise of the digital revolution and information and communication technologies (ICT). During this period, the most relevant innovations were personal computers, the internet, software, telecommunications, and later developments like mobile phones and early artificial intelligence systems (Moody & Nogrady, 2010).

Some of the clearest impacts of such new technologies in society include the transformation of industries through digitization, automation, and globalization, the creation of entirely new markets (e.g., digital media, online retail, social media), and increased productivity and connectivity across the globe.

The 6th wave of innovation, often considered to begin from 2020, is driven by sustainability, renewable energy, and advanced artificial intelligence. Therefore, it builds on the earlier waves of industrial and technological progress, but it is distinguished particularly by its focus on sustainability, green technologies, and the integration of advanced innovations to address global challenges (Uctu, Tuluca, & Aykac, 2024).

Therefore, the 6th wave represents a fundamental shift towards a sustainable, tech-driven, and interconnected global economy. Its success depends on how well humanity can manage the transition from extractive and polluting systems to regenerative and equitable ones.

In this context, the Petroleum industry, traditionally associated with fossil fuel extraction and greenhouse gas emissions, is generally considered by public perception as the biggest villain of the 6th wave.

The poor reputation of the Petroleum industry generated public and private pressure to expedite portfolio changes that are more acceptable to the environment. Some of the major oil companies, such as Statoil and Total, even changed their names to Equinor and TotalEnergies, respectively, aiming to change the public perception regarding their connection to hydrocarbons, aligning their image to energy transition.

The formation and impacts of reputation over individuals and companies have been greatly affected by the 5th wave of innovation. The connection between reputation and the internet is profound, as the internet has fundamentally transformed how individuals, businesses, and organizations build, manage, and perceive reputation. The internet amplified the concept of reputation, allowing information to spread faster and wider than ever before, with impacts on several as-

pects of society, including economical and political.

At the same time, the majority of the most relevant oil and gas companies are also state owned (partially listed or not) and, therefore, strong reputation can significantly influence their ability to operate effectively in global markets on top of affecting local political interest of its controlling shareholder (the State).

Moreover, since the Petroleum industry is one of the most capital-intensive industries in the world, some of the most important oil and gas companies are publicly listed and, therefore, their corporate reputation affects their stock value. The concept of reputation is central to the functioning of publicly listed companies. The performance of a stock reflects widespread assumptions among analysts and investors about the credibility of a company's financial forecasts and its capacity to deliver returns in the future.

Finally, with the 6th wave of innovation, the need for increased government intervention in the energy industry, including a variety of regulatory tools, became clear (Loss & Santos, 2025). As explained by Andrews-Speed (2015), energy transition needs government intervention because it is costly and driven by the need to address the long-term public external cost of energy use rather than deliver a short-term private benefit. Markets by themselves will be unable to deliver the required behavioral changes in the time required for energy transition.

In a world where, 1) energy transition is one of the primary goals of the society (6th wave), 2) Petroleum industry behavior is key to the achievement of energy transition, 3) reputation influences decisions of stakeholders in the Petroleum industry, and 4) the effects of reputation are multiplied by technology (5th wave), important questions arise, including what are the implications and elements of reputation and how it affects energy regulation and the behavior of the regulators, particularly with regard to the Petroleum industry.

That is the reason why we decided to study the relationship between reputational regulation and the Petroleum industry. Reputational regulation is one of the least studied fields of regulatory theories. However, in the current context, reputational regulation becomes more relevant, creating a bridge between the fifth and sixth waves of innovation, clearly impacting both the Petroleum industry and government behaviors.

Section 2 of this article explains the connection between corporate reputation and internet. Section 3 analyses the relationship between corporate reputation and the Petroleum industry. Section 4 discusses how reputation affects government behavior, including in the perspective of energy transition. Section 5 describes the theories of regulation, placing reputational regulation among those theories, detailing its key features and its limitations. Section 6 connects the theory of reputational regulation to the Petroleum industry in an energy transition scenario. In Section 7, we discuss how the election of President Trump affects the energy transition and its stakeholders. Finally, Section 8 of this article concludes that reputational regulation has never been more relevant, having implications over democracy itself and, certainly, over the Petroleum industry and energy transition and,

therefore, studies about this theory will assist public and private agents to better position themselves.

Throughout the article, the authors adopted a qualitative literature review methodology, focusing on interdisciplinary sources from law, economics, regulatory theory, and energy transition. The primary databases consulted were Google Scholar, SSRN and JSTOR, with keywords centering around “reputational regulation”. Preference was given to peer-reviewed academic publications, working papers from reputable institutions, and consolidated legal scholarship.

2. The Effects of Internet on Corporate Reputation

In the modern business environment, corporate reputation has emerged as a critical intangible asset that shapes how organizations are perceived by stakeholders and the public.

More than just brand image or public relations, corporate reputation reflects a company’s overall character as judged by its actions, communications, and long-term behavior. It plays a central role in determining stakeholder trust, financial performance, and an organization’s ability to survive crises. Corporate reputation is the collective assessment of a company’s trustworthiness, credibility, responsibility, and overall value by various stakeholder groups, including customers, employees, investors, regulators, and communities. Unlike short-term public opinion, reputation is built over time and is influenced by both a company’s internal practices and its external relationships. A company with a strong reputation is generally perceived as reliable, ethical, and competent, while a poor reputation may suggest dishonesty, mismanagement, or irresponsibility (Nardella, Brammer, & Surdu 2023).

Several key dimensions contribute to corporate reputation. First is trustworthiness, the extent to which the company is believed to act with integrity and keep its promises. Second is performance, which includes the quality of its products or services, financial stability, and innovation. Third is social responsibility, reflecting how the company engages with environmental, social, and governance (ESG) issues, including energy transition (Chukwukaelo, 2024). Finally, communication and transparency also play an essential role, as they influence how stakeholders perceive the company’s openness and willingness to be held accountable (Chasiotis et al., 2024).

The importance of corporate reputation cannot be overstated. A positive reputation offers a significant competitive advantage. It attracts and retains customers, strengthens investor confidence, helps recruit talented employees, and can even influence favorable regulatory treatment. Furthermore, companies with strong reputations tend to show greater resilience during crises, as the public is more likely to give them the benefit of the doubt and support their recovery. Conversely, a damaged reputation can result in lost sales, falling stock prices, employee attrition, and long-term brand erosion (Nicolas, Desroziers, Caccioli, & Aste, 2024).

In the last decades, ICT, developed during the 5th wave of innovation, which

refers to the integration of technologies used to handle information and facilitate communication, including networking and telecommunication, and particularly to the internet, have dramatically reshaped how corporate reputations are built and challenged.

The internet plays a major role in shaping, managing, and influencing an individual's or organization's reputation, since it makes information about individuals and organizations highly visible and accessible.

An individual's or organization's reputation can be influenced on a global scale through online platforms. Positive or negative information can spread rapidly online, amplifying its impact on reputation. The internet enables instant reactions to events, posts, or statements, allowing reputations to shift quickly.

Online scandals or controversies can escalate quickly and have long-lasting effects on reputation, resulting in organizations and individuals engaging in reputation management strategies to mitigate the impact of negative information (Soltani, Veer, Vries, & Kemper, 2024). People often base their trust on ratings and reviews they find online, with the internet also posing risks to reputation due to the spread of false information, through fake news and misinformation.

Companies utilize digital marketing, content creation, and social media to maintain a positive image. Tools like Google Alerts, Mention, and Brandwatch help track what is being said online about a person or brand. Prompt responses to queries or complaints on social media help maintain a good reputation.

The internet serves as both a powerful tool for building and enhancing reputation and an instrument where reputations can be easily damaged. Effective online reputation management is crucial for individuals and organizations in the digital age. It has revolutionized how companies operate, impacting everything from consumer interactions to internal processes, encouraging companies to innovate rapidly, respond to market changes, and adopt agile methodologies to stay competitive. Company's behavior is shaped in part by the internet, and those that adapt responsibly can build trust, loyalty, and long-term success.

Compared to traditional media, online platforms enable near-instantaneous, global dissemination of information, allowing even local incidents to escalate into international issues. Social media especially has "revolutionized this space", letting firms directly reach a vast network of stakeholders and altering the nature of corporate communication (Huan, 2024). However, these platforms present as many risks as opportunities. The unique speed and scope of online information transmission means that social media content can critically shape external stakeholders' perceptions of a company's credibility and trustworthiness.

In practical terms, this means stock prices and customer loyalty can be swayed by the tone of online conversations. Research confirms that bad news travels fastest on social networks: negative news is far more likely to be discussed and shared on social media than good news (Robertson et al., 2023).

Another key change is the rise of what might be called the "online court of public opinion". Traditional PR crises in the pre-internet era unfolded over days or

weeks through newspapers and TV coverage. Now, public reactions on X (formerly Twitter), Facebook, and other platforms often outpace official statements. When a company faces a scandal or accident, there is an information vacuum that will be filled one way or another. If the company does not quickly provide accurate information and take accountability, rumors and anger on social media will shape the narrative.

This dynamic forces companies to respond faster and with greater transparency than ever before. At the same time, attempts to spin or conceal information can backfire spectacularly due to the “Streisand effect”, where efforts to suppress news only make it more viral. In summary, the internet has made reputation management a more complex, real-time endeavor: firms must continuously monitor online sentiment and engage with stakeholders to prevent small sparks from turning into reputational wildfires.

High-profile incidents over the past decade underscore how the internet can amplify corporate reputational crises across all industries. A notable example is United Airlines’ PR disaster in April 2017. When videos emerged of a passenger being dragged violently off an overbooked United flight, they were uploaded by bystanders and “went viral” worldwide within hours (Rushe & Smith, 2017). Public outrage exploded across social media, with hashtags calling for boycotts.

The immediate reputational fallout was reflected in United’s stock price: nearly \$1 billion of the airline’s market value was erased in a single day of trading following the viral video and ensuing backlash. United’s CEO issued multiple apologies amid the online furor, illustrating how digital media had turned a local incident into a global reputational crisis overnight. This case demonstrated the new reality that any individual with a smartphone and social media account can inflict massive damage to a brand’s image by capturing and sharing wrongdoing (Hearit, 2021).

Another example is the Volkswagen “Dieselgate” scandal of 2015, which shows the internet’s role in disseminating and prolonging corporate crises. Volkswagen was found to have installed software to cheat emissions tests, a deception revealed by regulators but rapidly propagated by online news and social media discussions. The scandal’s hashtag #Dieselgate trended internationally as anger spread. Analysts noted that negative perceptions of VW surged, and the company’s once-strong reputation for trust and reliability was suddenly in jeopardy (Pulsar Platform Blog, 2015).

In fact, measures of consumer trust in the Volkswagen brand plunged by over 50% in the immediate aftermath of the revelations. Commentators observed that the emissions fiasco did severe, perhaps irreparable, damage to perceptions of VW.

Most importantly, the conversation didn’t fade quickly: social media monitoring showed that volumes of discussion about Volkswagen remained vastly elevated for months after the initial news, keeping the negative story in public view. Volkswagen’s experience underscored how the internet can turn a corporate crisis

into a lingering reputational nightmare, as online communities continue to reference and revive the issue long after traditional media coverage subsides.

These cases from the aviation and automotive sectors exemplify a broader pattern. In the digital era, corporate reputations can be unraveled in real time by viral content and online outrage. Companies are finding that decades of carefully cultivated brand image can be undermined by a single trending topic or video clip. As the above examples show, the consequences are not limited to public relations; they can tangibly impact financial performance, from plunging stock prices to lost sales. The internet has essentially democratized influence over corporate reputation, shifting power toward the public.

From the analysis above, it is evident that the internet has become inextricably linked to corporate reputational fortunes. Digital media can amplify corporate misdeeds or perceived missteps at lightning speed, often outpacing traditional crisis management efforts. Corporate reputation in the digital age is “omnidirectional”, influenced by voices from all sides rather than controlled top-down by the company (Pollak & Markovic, 2022).

In this new landscape, managing corporate reputation requires vigilance, transparency, and engagement. Companies must not only communicate swiftly and honestly during crises but also address the underlying issues that the internet-savvy public will inevitably unearth and debate.

There is a growing recognition that attempting to simply control the narrative is futile. Instead, businesses need to build genuine trust and be responsive to stakeholder concerns to withstand the swift tides of online sentiment.

According to Joachim Klewes and Robert Wreschniok, reputation is increasing its relevance as an intangible asset and source of competitive advantage, especially as products and prices become commoditized and stakeholders face information overload. In this context, a company’s competence, integrity, and attractiveness, in other words, its reputation, often outweigh traditional factors in winning stakeholder trust (Klewes & Wreschniok, 2009).

In conclusion, the internet has proven to be a powerful amplifier of reputational issues, capable of elevating local problems to global prominence. Those companies that understand this reality and adapt their strategies accordingly will be better equipped to protect and sustain their reputations in the digital era.

3. Corporate Reputation and the Petroleum Industry

Most fossil fuel reserves are controlled by national oil companies (NOCs) and by private publicly listed oil and gas companies.

NOCs are state-owned entities that perform the exploration, extraction, and sale of oil and gas resources inside or outside their countries. While many NOCs remain entirely government-owned, a subset has chosen to list a portion of their shares on public stock exchanges, allowing private and institutional investors to acquire equity stakes. According to the National Oil Company Database, there are 71 NOCs worldwide (National Oil Company Database, 2024). Among these, sev-

eral have publicly listed shares, including:

- 1) Saudi Aramco: Listed on the Saudi Stock Exchange (Tadawul) in December 2019, Saudi Aramco is among the world's most valuable companies;
- 2) Petrobras: Brazil's Petrobras is listed on the B3 (Brazil Stock Exchange) and the New York Stock Exchange (NYSE);
- 3) PetroChina: A subsidiary of China National Petroleum Corporation (CNPC), PetroChina is listed on the Hong Kong Stock Exchange and the NYSE;
- 4) Gazprom: Russia's Gazprom has shares listed on the Moscow Exchange and as Global Depositary Receipts (GDRs) on the London Stock Exchange (LSE);
- 5) Equinor: Formerly known as Statoil, Norway's Equinor is listed on the Oslo Stock Exchange and the NYSE;
- 6) PTT Public Company Limited: Thailand's PTT is listed on the Stock Exchange of Thailand.

It is important to note that, even in cases where NOCs are publicly listed, governments retain significant, if not majority, ownership stakes, maintaining substantial control over the companies' operations and strategic decisions.

While listed NOCs own a significant portion of the world's fossil fuel reserves, their share is still smaller compared to state-owned enterprises that are not listed. Listed NOCs collectively control approximately 25% to 35% of the world's proven oil and gas reserves; they are a subset of the broader category of the NOCs, which collectively control approximately 80% - 90% of global reserves ([International Energy Agency, 2020](#)).

Publicly listed oil and gas companies, with no state ownership, control a relatively small portion of the world's total fossil fuel reserves when compared to NOCs. The "supermajors" (ExxonMobil, Chevron, Shell, BP, TotalEnergies, and Eni) and other listed international oil companies collectively manage around 10% - 15% of global oil and gas reserves. Therefore, NOCs (listed or not) together with publicly listed oil and gas companies (not related to the state) account for at least 90% - 95% of the global oil reserves ([International Energy Agency, 2020](#)).

The points of discussion here are: What kind of role reputation plays in the decision-making process of these entities? Why is the relationship between corporate reputation and Petroleum industry different from any other industry? Why and how recently created technology and energy transition affected the Petroleum industry?

Corporate reputation is critically important to NOCs due to their unique role as both business entities and instruments of national policy. NOCs often require foreign investment, partnerships, or technology transfers to develop resources efficiently. A strong reputation for reliability, transparency, and stability enhances investor confidence, facilitating joint ventures or financing for large projects.

NOCs compete globally in selling crude oil, natural gas, and refined products. A positive reputation ensures favorable trade agreements, market access, and better pricing in international markets. They are also often seen as representatives of their country on the global stage. Therefore, their reputation can influence inter-

national perceptions of the nation's stability, governance, country's image and diplomacy (Pirog, 2011).

As state-owned enterprises, NOCs are closely tied to national interests and are often significant contributors to government revenue. A good reputation fosters public trust, critical for maintaining social stability and avoiding political or public backlash, influencing politics and even election results.

For publicly listed oil and gas companies, reputation is also a critical asset as it directly influences their ability to attract investors, customers, collect financial resources, and talent, while also determining their resilience during crises and, ultimately, its survival, as indicated by Fombrun (1996), as shown in **Figure 1**.

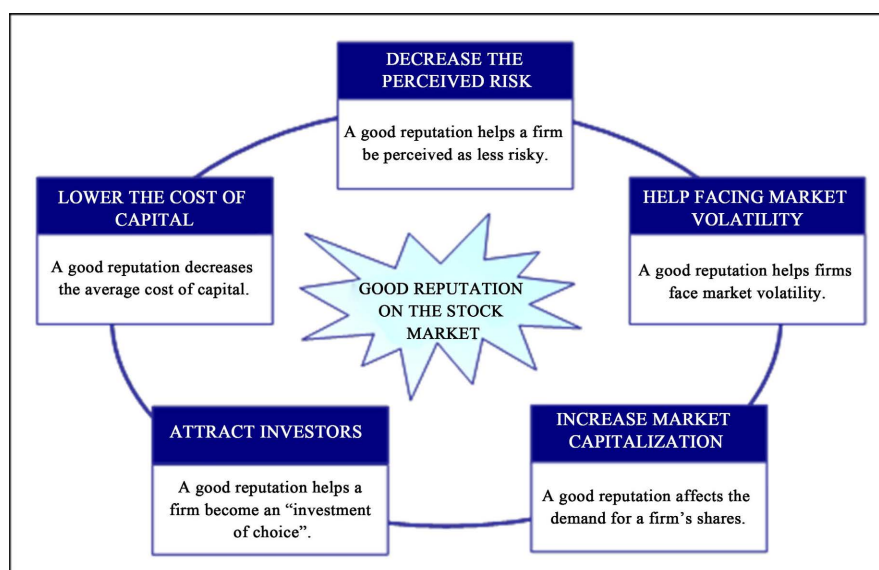


Figure 1. The benefits of corporate reputation on the stock market (Gabbioneta, Mazzola, & Ravasi, 2011).

A good reputation among financial audiences may help a publicly listed oil and gas company become an investment of choice (Gardberg & Fombrun, 2002), enhancing its ability to attract capital and decreasing its average cost of capital (Srivastava et al., 1997). Market perceptions over publicly listed oil and gas companies' future prospects tend to influence the level of demand for their shares, hence its market capitalization, as explained by Fombrun and van Riel (2004).

Analysts and investors are inclined to consider oil and gas companies with good reputation as comparatively less risky than poorly reputed ones. Hence, they are willing to accept higher financial risk for the same level of returns or lower returns for the same level of risk.

Furthermore, a publicly traded oil and gas company with stronger reputation faces market volatility better than one with weaker reputation. During market crises, corporate reputation may act as a reservoir of goodwill, helping companies recover from drops of share prices faster than poorly regarded firms, as evidenced by Gregory (1998). Similarly, Knight & Pretty (1999) demonstrated that shares of

companies that enjoy a good reputation suffer less and recover faster from stock market crashes due to corporate crises and catastrophes, product recalls, financial scandals, etc., than shares of poorly regarded companies.

In summary, reputation is a more critical asset for NOCs and publicly listed oil and gas companies than for most of the other industries, since it influences their ability to operate effectively, compete, attract capital and partnerships and maintain domestic (including political) and global (including diplomatic) trust.

As the energy sector undergoes a transition towards renewables and sustainable practices, considering the 6th wave of innovation, a good reputation for innovation and responsibility in this area can position NOCs and publicly listed oil and gas companies as leaders in the evolving energy landscape. Failing to act or showing slow progress, on the other side, can damage their reputation.

Global emphasis on Environmental, Social, and Governance (ESG) compliance has put pressure on NOCs and publicly listed oil and gas companies to demonstrate commitment to sustainability and responsible practices. Reputation and ESG are increasingly intertwined, as a company's approach to ESG issues can significantly shape public perception, stakeholder trust and competitiveness (Ni, Zhang, Tan, & Lai, 2024).

Energy transition is deeply linked to ESG principles. It is expected to a large degree by the financial markets that companies in the Petroleum industry and beyond must align their strategies with energy transition goals to address climate change, meet regulatory requirements, and respond to stakeholder expectations (Ramírez-Orellana et al., 2023). Compliance with climate-related regulations and initiatives directly impacts a company's reputation in the eyes of governments, consumers and investors.

Companies leading in renewable energy technology, carbon capture, or sustainable practices enhance their reputation as forward-thinking and responsible. Clear and measurable commitments (e.g., net-zero goals) bolster a company's image among environmentally conscious consumers and partners (Tan, Yan, & Chen, 2025).

Supporting local communities during energy transition (e.g., job retraining programs in regions dependent on fossil fuels) helps companies maintain goodwill. Reputation plays a role in securing a "social license to operate": public approval for business operations (Smith & Richards, 2015), which is very important for the Petroleum industry considering its connection to the State. Companies seen as resistant to the energy transition may face protests, divestment, or difficulties in obtaining permits.

Connected to the issue of reputation is the internet and social media. Companies in the energy sector, particularly oil and gas giants, have long grappled with public criticism over environmental and social impacts. In the past decades, the internet and social media have supercharged these reputational challenges.

Activists and citizens now use digital platforms to hold energy companies accountable in unprecedented ways, from exposing historical misconduct to organ-

izing viral protest movements. Several well-documented cases since 2015 illustrate this trend.

One major episode was the ExxonMobil climate change controversy, often tagged on social media as #ExxonKnew. In 2015, investigative journalists uncovered internal documents showing that Exxon's own scientists had supposedly warned management about the realities of climate change as early as the late 1970s (Hall, 2015). Yet for decades the company was accused of having publicly cast doubt on climate science. When these revelations came to light, they sparked widespread public outcry online and calls for accountability. The hashtag #ExxonKnew trended as hundreds of thousands of people were made aware of Exxon's apparent misinformation campaign via online news and social media (Hasemyer, 2015).

This digital activism quickly translated into real-world consequences: lawmakers and state attorneys-general took notice, and before long ExxonMobil faced official investigations and lawsuits. As of the mid-2020s, Exxon has become a defendant in multiple state and local lawsuits accusing it of misleading the public about climate change and its products' dangers. The company's reputation suffered greatly, especially among younger, climate-conscious demographics (NPR, 2023). The Exxon case demonstrates how the internet can resurrect decades-old corporate behavior and put it on trial in the present, subjecting a firm to sustained reputational damage and legal peril.

Another salient case is the Dakota Access Pipeline (DAPL) protests of 2016-2017, which highlight how social media can galvanize public opposition to energy projects and tarnish the companies involved. The DAPL, an oil pipeline project, became the focus of protests led by the Standing Rock Sioux Tribe and environmental activists concerned about water contamination and sacred lands. Through the hashtag #NoDAPL, the movement gained global visibility on social media, drawing support from diverse groups far beyond North Dakota.

Continued conflicts and attention on social media led to increasing national and global support for the protests, putting immense pressure on the pipeline's developers (Energy Transfer Partners and its partners) as well as on government authorities. Viral videos and posts depicted clashes between protesters and law enforcement, fueling public sympathy for the demonstrators and outrage at the pipeline sponsors.

This online-fueled backlash had concrete effects on the project's backers: facing reputational risk, several major banks withdrew their financing from the Dakota Access Pipeline under public pressure. For example, in early 2017 a consortium of European banks (including ING and BayernLB) announced they would divest or halt funding for DAPL, explicitly citing the public outcry and ethical concerns (BankTrack, 2017).

The DAPL saga shows that internet activism can directly impact corporate finances and force strategic changes, as well as inflict lasting reputation harm. Even after the pipeline was eventually completed, the companies involved had become

emblematic villains in the environmental justice community, a stigma that persists in online discourse.

Energy companies have also stumbled into reputational crises through their own attempts at social media engagement. A striking example was Royal Dutch Shell's Twitter episode in 2020. Shell posted an online poll asking, "What are you willing to change to help reduce emissions?"—an attempt to encourage public dialogue on climate solutions. The move backfired to a large degree (Carrington, 2020).

Though the poll received little direct participation, the tweet itself went viral due to a wave of angry responses. Many viewed Shell's question as "gaslighting" the public, deflecting responsibility onto individuals when Shell itself is a major carbon emitter. Prominent figures clapped back on Twitter: U.S. Congresswoman Alexandria Ocasio-Cortez's reply ("I'm willing to hold you accountable for lying about climate change...") was liked over 350,000 times, and climate activist Greta Thunberg accused Shell of "endless greenwash" in a widely shared post.

The torrent of backlash forced Shell to hide some replies and led to a public relations episode covered by mainstream media. In this case, the internet acted as a magnifying mirror, reflecting and enlarging public dissatisfaction with Shell's environmental record.

A single misguided social media campaign can thus result in a cascade of negative headlines and further erosion of trust, especially among younger, socially conscious audiences. The Shell incident is a cautionary tale that corporate attempts to shape their narrative online can be co-opted and turned against them by the public (Mavelli, 2025).

In addition to technological changes, recent modifications in the legal landscape have also contributed to the increasing relevance of corporate reputation to the Petroleum industry. As a highly regulated sector in most countries, oil and gas companies are subject to a complex set of administrative rules. In countries in which the reach of the judiciary into administrative rulemaking is limited by theories of judicial deference, such as the Chevron Doctrine, compliance with such rules and regulations is done mostly through interaction with regulatory agencies, which also have latitude in interpreting the relevant statutes and determining the scope of their authority (Elliott, 2005).

Since, however, the Chevron Doctrine being struck down in the United States in 2024, American courts have regained a central role in the implementation and interpretation of regulations. The Supreme Court explicitly overturned Chevron on June 28, 2024, in *Loper Bright Enters v. Raimondo*, 603 U.S. 369 (2024). However, the court had indicated in previous rulings limitations to Chevron, such as in *West Virginia v. Environmental Protection Agency*, 597 U.S. 697 (2022). This has meant that technical issues which would previously be determined in the administrative sphere by qualified and technical public servants are now potentially left to the hands of judges, who in most cases possess no special qualification in the area which is being regulated.

The lack of technical knowledge, added to the natural susceptibility of courts to public opinion (Sunstein, 2007; Rehnquist, 1986) means that the importance of

corporate reputation greatly increased with the overturning of judicial deference in administrative rulemaking.

A judge with no deep or technical knowledge of the Petroleum industry, for example, might be much more predisposed than a technical regulator to factoring in aspects of the reputation of the company in question when deciding issues relating to the application of environmental and climate rules.

With public scrutiny heightened by the internet and increasing judicial scrutiny of regulation, the Petroleum industry is incentivized to adopt socially responsible practices, such as environmental sustainability, including energy transition. For oil and gas companies which are susceptible to public opinion to thrive sustainably in the internet age, they may need to balance innovation with ethical behavior, including committing to reducing environmental impacts through green technology.

4. Reputation and the Government

Reputation plays a crucial role in how governments are perceived both domestically and internationally. Government's reputation among its citizens is vital for maintaining public trust. Transparency, accountability, and effective policies can bolster reputation, while corruption, inefficiency, or scandals can erode it.

A positive reputation enhances the legitimacy of the government, making it easier to enforce laws and implement policies without significant resistance. In democracies, reputation directly impacts electoral outcomes (Levi, 1998). Governments with strong reputations are more likely to win voter support. Reputation-conscious governments may avoid controversial or unpopular policies to maintain public support, even if those policies are necessary but politically risky (Busuioac & Lodge, 2016).

A government's reputation affects its relationships with other nations. A trustworthy and reliable reputation can foster alliances and trade agreements, while a negative reputation can lead to isolation or sanctions. To maintain credibility, governments may align their actions with international norms and standards (e.g., on climate change, human rights, or trade agreements).

Nations with good reputations are more likely to attract foreign direct investment and international aid. Stability, rule of law, and ethical governance are key factors influencing this perception (Jensen, 2003). Reputation contributes to a country's soft power—the ability to influence others through cultural appeal, values, and diplomacy rather than coercion or military strength. Actions in sectors like banking, trade, and technology are often influenced by the need to protect a reputation for economic responsibility.

Open communication and transparency about policies and decisions help governments build trust. Consistent actions and policies that align with stated principles strengthen reputation. Responsiveness to crises, such as natural disasters or economic downturns, demonstrates competence and builds credibility (Kindsmüller, 2022). Leaders who prioritize integrity and fairness contribute positively to a government's reputation. A good reputation can lead to better credit ratings and

lower borrowing costs, incentivizing governments to maintain fiscal discipline (Chasiotis et al., 2024).

Citizens may lose trust in the government, leading to protests, decreased civic engagement, or demands for reform. A damaged reputation can deter investors, slow economic growth, and increase borrowing costs. Loss of reputation can lead to political instability, with opposition groups gaining traction or calls for leadership changes.

Reputation plays a key role during elections, as governments often tailor their actions to align with public sentiment, focusing on issues that resonate with voters. Governments are cautious about decisions that could lead to allegations of misconduct or scandals, which could damage their reputation and electoral prospects. In some cases, governments may prioritize short-term, popular policies over long-term benefits to protect their immediate reputation.

Reputation acts as both a motivator and a constraint on government actions. While it can drive positive governance by encouraging transparency, accountability, and ethical decision-making, it can also lead to overly cautious or populist choices. Balancing reputational concerns with the need for effective governance is essential for long-term success.

Similarly to what happened to the Petroleum industry, the internet has had a profound impact on the relationship between government and its citizens. The internet affected directly reputation, impacting how people participate in politics, and how governments function. It provides unprecedented access to diverse sources of information, allowing citizens to be more informed about political issues and government policies.

Online platforms enable individuals to engage in discussions, sign petitions, and organize protests more easily. Social media has become a powerful tool for mobilizing grassroots movements. Governments and public officials are under greater scrutiny as their actions can be documented and shared widely online. Whistleblowers and investigative journalists use the internet to expose corruption and abuse of power.

The internet fosters connections across borders, allowing citizens to learn from democratic movements worldwide and to coordinate transnational activism. Many democracies use the internet for e-governance initiatives, improving transparency and efficiency in delivering public services and engaging with citizens.

On the other hand, the spread of false or misleading information can undermine trust in democratic institutions and influence elections (Lewandowsky, 2024). Social media algorithms often amplify sensationalist or divisive content. Unequal access to the internet creates disparities in political participation, leaving marginalized groups without a voice in the digital public sphere.

Governments and private companies may misuse the internet for mass surveillance, undermining individual freedoms and democratic values. Algorithms on social media often create “echo chambers”, where users are exposed only to information that reinforces their beliefs, deepening political polarization (Interian, Marzo, Mendoza, & Ribeiro, 2022). Therefore, while the internet can empower

democratic movements, authoritarian regimes also use it to spread propaganda, censor dissent, and monitor activists.

The internet's relationship with democracy is complex and evolving, it has profoundly impacted democracy, both positively and negatively. To maximize the democratic potential of the internet while mitigating its risks, policymakers, tech companies, and civil society need to collaborate. Collaboration efforts include:

- 1) Promoting digital literacy to help users identify credible information;
- 2) Regulating big tech to ensure transparency and accountability;
- 3) Closing the digital divide to enable equal participation; and
- 4) Protecting online freedoms while combating harmful content.

Considering that the internet offers immense potential to strengthen democracy, but also poses significant risks, regulation of the internet has been subject of intense discussion worldwide (Mayer-Schonberger, 2002). Internet regulation seeks to balance promoting free expression and innovation with addressing potential harms like misinformation, cybercrime, and breaches of privacy.

Some of the issues discussed in the sphere of internet regulation are: 1) efforts to prevent the spread of false or misleading information, especially during elections or public crises; 2) policies to address online harassment, hate speech, and content promoting violence; and 3) blocks or filters to content deemed inappropriate or harmful.

On the other side, some of the challenges to regulate the internet are: 1) balancing regulation and freedom; 2) since internet is a global network and regulations often vary by country, it creates conflicts and inconsistencies; and 3) rapid technological advancements, such as artificial intelligence (AI) and blockchain, outpace regulatory frameworks.

Approaches to internet regulation vary a lot. Companies like Meta (Facebook), Twitter, and Google set their own rules for moderating content (Klonick & Kadri, 2018). There is also government-led regulation, which are laws targeting specific issues, such as the Digital Services Act (DSA) in the EU, aiming to hold platforms accountable for content moderation and transparency.

Agreements like the Budapest Convention on Cybercrime encourage collaboration on cross-border cyber issues. However, global frameworks for internet governance are still limited. Public-Private Partnerships also exist; they consist of collaboration between governments, private companies, and civil society organizations to address challenges like cybercrime and misinformation.

Internet regulation is a delicate balancing act, requiring cooperation between governments, tech companies, and society to ensure that internet remains a space for innovation, free expression, and equitable access while addressing its potential harms.

5. What Is Reputational Regulation?

The regulatory practices are now mostly studied through the theories of regulation. Such theories attempt to explain why regulation emerges, which actors con-

tribute to that emergence and the typical patterns of interaction between regulatory actors. In answering those questions, the theories of regulation range beyond law to other disciplines, including politics, economics and sociology.

Each theory of regulation highlights different aspects of why and how regulation occurs. In practice, regulatory outcomes often reflect a mix of these theories, influenced by specific economic, political, and institutional contexts. Understanding these frameworks helps policymakers design effective and balanced regulations. Some of the most studied theories of regulation are:

1) Public Interest Theory—the oldest of the theories of regulation, it explains regulation as a means to serve the public interest and correct market failures. It provides that governments intervene in markets to improve social welfare by addressing inefficiencies, inequities, and other issues that private markets cannot resolve on their own (Hantke-Domas, 2003). Critics to this theory, such as Posner (1974), argue that regulation is costly and that it is often shaped by the self-interest of politicians, bureaucrats, or special interest groups rather than the public interest. Furthermore, critics pointed out that while this theory justified government regulation based on market failure, it did not adequately address government failure as a byproduct of regulation (Larkin Jr., 2016).

2) Capture Theory—this theory sheds lights into when regulation eventually serves the interests of the industry being regulated, rather than the public, because the industries have better resources and expertise to influence regulators. The theory of regulatory capture is associated with Nobel laureate economist George Stigler, one of its major developers (Stigler, 1984 and Peltzman, 1976). Critics to this theory say that it underemphasizes situations where regulators resist capture, overemphasizing industry influence, neglecting other stakeholders.

3) Economic Theory of Regulation—pursuant to this theory, regulation is a product of supply and demand, driven by the self-interest of politicians, regulators, and special interest groups. Regulation is seen as a good or service that can be “bought” by interest groups (e.g., industries, consumers, or labor unions) and “supplied” by politicians or regulators (Peltzman, Levine, & Noll, 1989). Some critics to this theory say that it assumes regulators always act rationally and ignores complexities like behavioral biases or institutional constraints. Critics also argue that not all regulation is exploitative or driven by rent-seeking; some genuinely serve the public interest.

4) Public Choice Theory—this theory purports that regulators and policymakers act in their own self-interest, like any other economic agent. Regulatory outcomes often reflect the interests of powerful groups rather than the public. According to critics, this theory overemphasizes self-interest and neglects altruistic or ideological motivations.

5) Behavioral Theories of Regulation—followers of this theory say that regulators may not have perfect information or rationality, therefore, regulation is shaped by bounded rationality, cognitive biases, and institutional constraints affecting both regulators and the regulated and decision-making is influenced by

heuristics, biases, and political pressures (Sunstein, 2014). According to critics of this theory, it is difficult to quantify behavioral impacts, and it may not provide clear solutions to improve regulation.

6) Self-regulation theory—self-regulation can be described as a governance mechanism where an industry or group of people regulate themselves, instead of being regulated by a State government. Governments may grant regulatory power to the private organization. Self-regulation can be used in many areas, including public corporate governance, sustainable finance, and the securities industry. Self-regulation can be an important mechanism for mitigating governance challenges, helping industries solve problems among themselves before turning to the state regulator. Critics to this theory say that the major disadvantage of self-regulation is enforcement. There needs to be incentives to monitor and enforce standards, and self-regulatory regimes without statutory backing are, in general, weak on this regard (Black, 2008).

One of the objectives of this article is to place the reputational regulation among those theories and establish its connection to the Petroleum industry and energy transition. “Reputational regulation” refers to the process by which organizations are influenced to alter or maintain their behavior due to concerns about reputation, public image, and stakeholder trust, rather than direct legal mandates. It leverages public perception, trust, and accountability to encourage adherence to norms, ethical practices, and societal expectations.

In essence, reputation functions as a form of informal social control or “soft regulation”. The core idea is that reputation is an asset that people and organizations seek to protect. When reputation is threatened, parties are incentivized to act in ways that align with public expectations, including, but not limited to, companies and regulators.

According to Von der Crone & Vetsch (2009), information asymmetries are inherent in markets and reputation serves as an enforcement mechanism. Therefore, regulation takes the task of informing market participants of their counterparties’ standing by sending quality signals to support their reputation, this allowing for efficient trade. In an effective regulation, regulators assume responsibility for the quality signals issued.

Although reputational regulation is one of the least studied fields of the regulatory theories, some articles have explored this concept across certain industries:

1) “Reputational Regulation”, by Parella (2018), identifies four types of reputational sanctions—financial, policy, regulatory spillover, and barriers to entry that encourage corporations to change their practices.

2) “The Regulation of Reputational Information”, by Goldman (2011), discusses the role of reputational information in marketplaces, emphasizing the importance of the free flow of such information for well-functioning markets.

3) “Regulatory Sanctions and Reputational Damage in Financial Markets”, by Armour and Polo, explores how regulatory actions can lead to reputational damage in financial markets, highlighting the interplay between formal sanctions and

informal reputational consequences. According to this article, reputational sanctions are, for some categories of misconduct, far more potent than direct penalties (Armour, Mayer, & Polo, 2017).

Reputational regulation initially operates through public visibility (investigative journalism and social media expose environmental and ethical concerns) and investors and public demand for better sustainability practices, including NGO and activist campaigns.

From a theoretical standpoint, reputational regulation operates through information and perception. One model described in legal scholarship is “regulation by shaming”: for example, litigation or media coverage exposes wrongdoing, that information enters the public domain, and ensuing public disapproval damages the organization’s reputation, prompting voluntary changes in behavior.

These reputation-based incentives lie outside traditional legal processes. They rely on public opinion and market reactions rather than court orders or statutes. Kishanthi Parella’s article, “Reputational Regulation”, has identified various forms of reputational “sanctions” that can pressure organizations, including financial sanctions (lost sales or boycotts), policy sanctions (pressure to change internal policies), regulatory spillover (one issue tarnishing the organization’s standing in other regulatory domains), and barriers to entry (reputation affecting the ability to enter new markets or industries). All of which act as informal enforcement tools.

A key feature of reputational regulation is its flexibility and breadth. It can be mobilized by a wide range of actors, not only regulators, but also consumers, investors, NGOs, media, and other stakeholders. Because modern markets are highly transparent and interconnected, information about corporate behavior (good or bad) spreads quickly, and stakeholders can collectively reward or punish companies. A strong reputation for integrity and responsibility becomes a protective asset, while a poor reputation can lead to severe consequences.

Importantly, reputational considerations can lead organizations to self-regulate beyond what the law demands. A corporation might comply with stricter environmental or safety standards than required, knowing that a scandal or accident would be disastrous for its image.

When a reputational threat does arise, organizations tend to respond swiftly. Public relations crisis management is essentially the reactive side of reputational regulation. Companies under fire from media or social media campaigns will often announce internal investigations, leadership changes, revised policies, or public apologies in an effort to stem reputational damage. The underlying motivation is to restore public trust and demonstrate accountability to avoid loss of business or further scrutiny. Notably, these responses can occur even in the absence of legal action, it is the perception of wrongdoing that forces the response.

However, reputational regulation should not be confused with traditional self-regulation. Both reputational regulation and self-regulation are mechanisms used to ensure compliance with norms, ethics, or standards. They operate differently

in terms of motivation, enforcement, and effectiveness.

While reputational regulation refers to the process of regulation based initially on the fear of reputational damage caused by public opinion, media exposure, or stakeholder reactions, self-regulation occurs when an industry, organization, or company voluntarily creates and enforces its own rules, standards, or ethical guidelines without direct government intervention.

For example, when a major data-privacy scandal hit Facebook in 2018 (the Cambridge Analytica affair), the company faced immediate public backlash and a #DeleteFacebook movement, even though the legal consequences at that moment were minor. In reaction, Facebook's leadership issued apologies and pledged changes (such as tightening data access policies and increasing transparency) to mitigate the 'rapid erosion of public trust' the scandal had caused. This shows that the court of public opinion can often be as demanding as regulators or a court of law, if not more so, in driving corporate behavior (NPR, 2018).

Therefore, reputational regulation is more reactive (responding to public backlash), whereas self-regulation is proactive (establishing rules before issues arise). Both have strengths and weaknesses, and a combination of both may be applicable to maintain ethical standards. A company's corporate social responsibility (CSR) standards and conducts, for example, may be driven by both reputational regulation and by self-regulation. As detailed below, CSR and disclosure mechanisms can be instruments for the implementation of effective reputation regulation policies, but the reputational regulatory phenomena analyzed herein is broader than just CSR.

Some of the key features of reputational regulation are:

- 1) Voluntary Compliance: Firms and individuals are incentivized to maintain a good reputation because it affects their economic and social standing, influencing customer trust, investor confidence, and competitive advantage.
- 2) Legal and Regulatory Spillover Effects: Reputational regulation leads to formal legal consequences, including lawsuits, government investigations, and stricter regulations.
- 3) Public-Driven Accountability: Businesses and government are held accountable by the public, including consumers, investors, employees and voters. Pressure from NGOs, watchdog organizations, and activist groups forces companies to improve practices. Employee activism and consumer advocacy can drive change from within organizations.
- 4) Disclosure: Reputational regulation depends on stakeholders having access to information about an organization's actions.
- 5) Media and Social Pressure: The media plays a crucial role in exposing practices and amplifying public scrutiny. Social media platforms allow real-time public opinion formation, influencing corporate or government decisions.
- 6) Risk of Misuse: Some companies manipulate reputational regulation by exaggerating or misrepresenting their efforts. Rules are created to regulate it.
- 7) Global and Cross-Border Impact: Reputational regulation is not limited by

national boundaries. Global corporations must navigate international reputation risks.

While reputational regulation can be a powerful force for change, especially in areas like energy transition, corporate ethics, and human rights, it has limitations that may reduce its effectiveness.

Reputational regulation only works when there is widespread public awareness. If media coverage fades or the public loses interest, companies may revert to harmful practices. Moreover, some industries are less vulnerable to reputational damage because they do not rely heavily on consumer perception or public trust.

In addition, companies may manipulate public perception through greenwashing or misleading sustainability claims without making substantive changes. Also, companies often prioritize short-term profits over long-term reputational risks. If the cost of change is too high, they may accept reputational damage rather than take costly corrective actions.

Since reputational regulation is directly related to public perception, it can be influenced by (and propagate) populist-driven ideas and misinformation, especially in contexts in which the public has incomplete information or ideological bias. While the risks of misinformation may be mitigated through regulation of social media, reputational regulation may also lead companies or government to prioritize short-term image management over long-term structural changes, undermining the very goals that the public opinion seeks to achieve. These risks highlight the need for safeguards such as transparency, media literacy, and institutional checks to ensure that reputational regulation is effective in achieving public and societal objectives.

Finally, companies can ignore criticism without facing fines, lawsuits, or regulatory sanctions. This is particularly applicable to those companies that are so large or essential that reputational regulation has limited impact on their success. Thus, reputational regulation is most effective when combined with legal and regulatory spillover effects, which in our view are an essential part of the concept.

However, reputational sanctions can, in some cases, be more potent than direct financial or legal penalties (Armour, Maye, & Polo, 2017). This is particularly true for certain categories of misconduct where public perception, trust, and long-term business viability are more critical than the immediate cost of a regulatory fine.

Large corporations frequently budget for regulatory fines as part of their risk management strategy, meaning direct penalties may not deter misconduct effectively. Reputational damage, on the other side, erodes stakeholder trust over time, affecting consumer loyalty, investor confidence, and employee morale. Investors and financial markets often react more sharply to reputational crises than to fines. Stock prices usually fall more drastically due to bad publicity than due to legal penalties.

Reputational pressure has frequently prompted organizations to enact reforms or policy changes that they might not have undertaken due to law alone. For example, during the 1990s, Nike became the target of intense activist and media

campaigns exposing poor labor conditions (sweatshop allegations) in its overseas suppliers. The company initially denied responsibility for contractors' practices, but as protests grew and Nike's brand was sullied (with even a magazine showing a child sewing Nike soccer balls for pennies), the reputational damage escalated.

In 1998, Nike's CEO publicly conceded the existence of a PR problem, saying "the Nike product has become synonymous with slave wages and abuse". Under mounting public pressure, Nike eventually overhauled its supply chain standards, investing heavily in monitoring factories, raising labor standards, and publishing independent audit reports. These changes were not mandated by any law at the time, they were driven by Nike's need to regain public trust and protect its brand. The entire footwear industry followed suit, and Nike today portrays itself as a leader in ethical manufacturing, a turnaround born from reputational regulation (*Guardian, 2015*).

Reputational regulation also differs in significant ways from formal (legal or governmental) regulation, though the two can complement each other. Formal regulation involves codified rules, laws, and enforcement actions by authorities (e.g. fines, inspections, licenses, court orders).

Reputational regulation, by contrast, is an informal, decentralized mechanism where the "enforcers" are essentially the public and stakeholders reacting to information. Because of this, reputational pressures can sometimes be more agile and immediate than formal regulation. Public opinion can shift overnight in response to a scandal, whereas legal processes often take years.

For example, a company might face instant backlash on social media for a controversial advertisement, long before any regulator could step in. This immediacy gives reputational regulation a certain power since companies have to be constantly vigilant and responsive to their stakeholders' values, not just to the letter of the law.

In other words, formal regulation is a deliberate, structured system of control, while reputational regulation is an emergent, sometimes uneven force. It is possible to have something be legal but still viewed as unethical by the public (e.g. aggressive tax avoidance or selling products that are legal but harmful to health), reputational regulation will kick in for the latter even if formal law is silent.

Despite these differences, formal and reputational regulation often work hand-in-hand. In many scenarios, legal enforcement and reputational incentives reinforce each other. Regulators themselves frequently use transparency and publicity as part of their enforcement strategy, effectively leveraging reputational regulation to boost compliance.

For example, government agencies may publish 'top violator' lists or compliance scorecards, hoping that companies will improve to avoid being named and shamed. Conversely, reputational pressure can spur the creation of new formal regulations. If public outcry reveals a regulatory gap, lawmakers may step in to formalize rules (consider how corporate scandals have led to new laws, such as financial fraud cases prompting Sarbanes-Oxley Act, or privacy uproar spurring

data protection laws).

Reputational regulation can thus be seen as the front line of norm enforcement, operating in real-time, with formal regulation codifying or backstopping those norms over the longer term. In summary, formal regulation provides the coercive power of the state and consistency, while reputational regulation provides the social pressure and moral suasion that can fill gaps and often motivate behavior in areas beyond the reach of law. They can be viewed as complementary. Where formal regulation is weak or absent, reputational forces become especially critical for accountability.

6. Reputational Regulation, the Petroleum Industry and Energy Transition

The connection between energy transition and reputational regulation is evident. Energy transition is reshaping the reputation of companies in the energy sector. As governments, regulators, investors, and consumers demand cleaner energy solutions, energy companies, oil and gas in particular, face growing reputational pressure to demonstrate their commitment to sustainability.

In fact, the energy transition requires significant policy and market shifts. However, traditional regulatory tools, such as command-and-control regulations, subsidies, and market-based instruments, often struggle to effectively support this transition due to their rigidity, slow adaptability, and limited scope.

Governments historically regulate energy markets through emission limits, efficiency mandates, and sector-specific regulations. Nevertheless, fixed regulations may not adapt to evolving technologies or market conditions, industries may resist change due to the financial burden of meeting strict mandates, and regulatory changes often require long legislative processes, delaying urgent climate action.

Governments provide grants, tax credits, and feed-in tariffs to support clean energy, but over-reliance on subsidies can lead to inefficient investments and discourage market competition. Public funding for energy transition programs is often limited and politically unstable, and, therefore, small players and developing regions may struggle to benefit from subsidy programs due to bureaucratic complexity.

Carbon taxes and cap-and-trade systems aim to internalize the environmental costs of fossil fuels, but many carbon taxes remain too low to drive meaningful behavioral change. Political resistance from high-emission sectors can delay or weaken carbon pricing policies, and different carbon pricing schemes across regions create market inefficiencies and loopholes (Patnaik & Kennedy, 2021).

The shift to renewables is not just a technological update but a systemic transformation that traditional regulations were not designed for. It requires transitioning from centralized fossil fuel plants to distributed renewable energy sources (e.g., rooftop solar, microgrids) and integrating energy sectors (electricity, transport, heating) requires regulatory harmonization beyond traditional frameworks. Regulations often struggle to keep pace with innovations in batteries, hydrogen, and

smart grids.

Moreover, while the energy transition is inherently global in scope and impact, traditional regulation remains largely the domain of sovereign states. This mismatch between the global nature of the task and the national focus of regulatory frameworks creates significant barriers to coordinated progress.

Each country has its own standards, incentives, and timelines for energy transition. This patchwork approach creates uncertainty for global companies trying to invest in clean technologies or carbon-neutral operations. What is legal or profitable in one jurisdiction might be restricted or penalized in another.

Some countries offer generous subsidies for renewables or carbon pricing mechanisms, while others protect fossil industries. This creates an uneven playing field and can lead to regulatory arbitrage, where companies move operations to jurisdictions with laxer rules (Adrian, Bolton, & Kleinnijenhuis, 2022). Emissions in one country affect the whole planet, but governments are accountable to local voters and industries. This misalignment makes it hard to enforce ambitious international agreements like the Paris Accord without domestic political will.

Where formal regulation falls short, reputational regulation can serve as a mechanism to drive change. Energy companies and governments that lead in climate action can gain access to green finance, strengthen stakeholder trust, and influence global standards. Public perception, consumer behavior, and investor expectations are increasingly shaped by environmental performance.

Mechanisms like ESG reporting, international carbon disclosure initiatives, and global sustainability indices are tools through which reputation is quantified and communicated across borders (Gao et al., 2022).

Reputation-driven tools, such as green financing and consumer behavior, are becoming powerful forms of soft regulation. Access to capital is increasingly contingent on environmental performance. Banks and investors are tying lending conditions to ESG metrics, incentivizing companies to align with sustainability goals (Yu, Liang, Liu, & Wang, 2023).

Consumers are using their purchasing power to reward environmentally responsible companies and penalize polluters. Social media has amplified this influence, turning public backlash into a significant reputational and financial risk. Voluntary commitments to net-zero targets or renewable energy adoption are tracked by watchdogs and NGOs, creating public accountability mechanisms that mirror regulatory compliance.

To align regulation with the scale of the energy transition, global institutions must play a more proactive role. Bodies like the United Nations, International Energy Agency (IEA), and World Bank can establish common sustainability benchmarks and reporting guidelines, ensuring coherence across national borders.

Global institutions can support developing countries in implementing climate policies by providing funding, expertise, and technology transfer, and should take on stronger roles in monitoring progress against climate targets and enforcing

transparency.

These mechanisms don't replace traditional regulation but can shape behavior in its absence, particularly in countries where environmental governance is weak or inconsistent. Therefore, reputational regulation plays a critical role in accelerating the energy transition process, which has a limited timeline to be accomplished. Companies that fail to transition risk losing public trust, investment capital, and market share. Meanwhile, those that embrace clean energy early may gain reputational advantages.

As an example, we can use the case of ExxonMobil. ExxonMobil, one of the world's largest oil and gas companies, has faced intense scrutiny over its role in climate change. Unlike some competitors, like BP, Shell, and TotalEnergies, that embraced self-regulation and proactive sustainability efforts, ExxonMobil at one point largely resisted major environmental reforms until it faced severe reputational pressure.

As explored earlier, ExxonMobil was directly involved in a scandal relating to supposed knowledge of the climate impacts of its actions dating from the 1970s (Hall, 2015).

Environmental groups, investors, and consumers condemned ExxonMobil for misinformation and lack of action. Lawsuits were filed against the company for misleading shareholders and the public (such as *Commonwealth v. ExxonMobil Corp.*, No. 1984CV03333, Mass. Super Ct. Oct. 24, 2019). Major investors (e.g., BlackRock and Vanguard) began pressuring ExxonMobil to improve its sustainability policies or risk divestment (Olson, Krouse, & Kent, 2017).

The United States and the European Union launched investigations into ExxonMobil's alleged climate deception, increasing the likelihood of stricter fossil fuel regulations. ExxonMobil lost shareholder confidence, faced increasing litigation costs, and saw a decline in stock value compared to competitors which were, at the time, seen as more committed to sustainability.

In 2022 ExxonMobil announced climate-related policies, including carbon capture investments and a pledge to reach net-zero emissions by 2050, mainly to appease investors and reduce reputational damage. However, ExxonMobil's response was perceived by some as slow, which damaged its credibility. The company continues to face lawsuits and activist shareholder interventions (Hays, 2021).

The ExxonMobil case is a classic example of reputational regulation. The company acted in the face of significant public and government pressure, lawsuits, and financial risks. This reactive approach was seen to damage its reputation and, at one point, compromise its long-term viability, according to investors, compared to competitors that embraced energy transition early on. Companies which self-regulated earlier by investing in renewables faced less reputational damage and gained credibility with ESG-focused investors.

In fact, the Petroleum industry is increasingly facing environmental lawsuits across the globe, many of which aim to hold it accountable for its contributions to climate change, environmental degradation, and human rights impacts. These

lawsuits often lead to not just legal consequences but reputational sanctions, as explored in Kishanthi Parella's work.

A relevant case in this arena was *Milieudefensie et al. v. Royal Dutch Shell*. In May 2021, the District Court in The Hague issued a landmark ruling ordering Shell to reduce its global carbon dioxide emissions by 45% by 2030 (from 2019 levels) to align with the Paris Agreement goals.

The court found that Shell's climate plan was insufficient and that the company had an unwritten duty of care under Dutch law, as well as human rights obligations (right to life and family life under the European Convention on Human Rights), to prevent dangerous climate change. This decision marked the first time a corporation was legally compelled to align its business with global climate targets, and it was hailed as a major victory for climate activists.

Shell appealed the verdict, and in November 2024 the Dutch Court of Appeal overturned the order for 45% emissions cut, finding 'no societal standard of care' requiring a specific reduction percentage by Shell. The appeals court agreed that Shell must contribute to emissions reduction but concluded it could not impose a fixed target.

TotalEnergies, for instance, was sued in 2020 by French NGOs and local authorities (joined even by the city of New York) under France's novel duty of vigilance law. The plaintiffs argued that Total's business plan was not aligned with the Paris Climate Agreement and sought a court order forcing the company to adopt a concrete climate transition strategy.

This lawsuit was based on a 2017 French law that requires large companies to identify and prevent environmental and human rights risks in their global operations. In essence, the case framed inadequate climate action as a breach of a legal duty of care. In 2023, however, a French court declined to hear the suit on procedural grounds, deeming the claims inadmissible under the vigilance law at that stage.

The court's refusal to consider the merits was a setback for campaigners, but even when such cases do not succeed in court, they generate public scrutiny. The broad coalition that took on Total, spanning NGOs and municipalities, and the publicity around the case underscore how climate litigation is a key battleground for climate activism.

Legal judgments and allegations against oil companies reverberate far beyond fines or injunctions. The interplay of legal accountability and reputational sanctions is visibly influencing how oil companies and their stakeholders behave. In the face of lawsuits and the attendant public pressure, companies have begun adjusting their strategies and messaging, albeit to varying degrees.

Public perception of oil companies has undeniably shifted due to these lawsuits. Where once these companies were seen as respectable pillars of the economy, many now view them as bad actors whose business model endangers the planet. Surveys in recent years have found record-low public trust in fossil fuel companies, and they are frequently ranked among the least reputable industries (along-

side tobacco).

This highlights another relevant aspect of reputational regulation, which is its reach beyond publicly traded companies, which were at the center of the lawsuits explored above. Although those companies are the most directly affected by the changes in public opinion, state-owned enterprises (even non-listed) are also affected through political pressure exercised by the State, which in turn often reflects accountability mechanisms for public opinion within the structure of said State. Furthermore, even private, non-state-owned companies in sectors like oil and gas are influenced by reputational regulation, since the reputation of the industry as a whole drives the enactment of sector-wide regulations and standards. This can mean, for example, that the bad reputation of a sector may lead financial institutions to restrict access of the sector as a whole to credit for fear of being associated with such sector in the eyes of public opinion.

Another important aspect of reputational regulation is the role of the government. As explained, reputational regulation primarily relies on public pressure, market forces, and media exposure to influence corporate behavior. However, government plays a crucial role in either reinforcing or enabling reputational regulation.

Regulatory and government actions are directly influenced by reputational effects. Politicians respond to voter sentiment, and as the public grows more climate-conscious and less sympathetic to oil companies, regulators gain the mandate to act boldly. While reputational regulation is not directly imposed by the government, policymakers can shape how effective it is through various mechanisms. Therefore, reputational regulation can be incorporated into policymaking frameworks in a series of ways, as detailed below.

First, governments can strengthen reputational regulation by creating transparency, public accountability, and legal mechanisms that expose corporate misconduct, including:

- 1) **Disclosure Requirements:** Governments enforce rules that require companies to disclose information on ESG performance (e.g., carbon emissions, human rights practices, financial risks). Example: The European Union's Corporate Sustainability Reporting Directive (CSRD) requires large companies to publicly disclose sustainability data, making reputational regulation more effective by increasing public awareness; likewise, the Securities and Exchange Commission (SEC) has recently finalized its rules on the "Enhancement and Standardization of Climate-Related Disclosures for Investors", requiring disclosure of certain sustainability data. The rules were in effect for a few days before the SEC decided to stay their implementation in view of legal challenges. More recently, the Commission had indicated that it might not pursue the defense of the rules in court. For the opinion of the one commissioner on the matter, see [Crenshaw \(2025\)](#).

- 2) **Supporting Whistleblower Protections:** Governments create laws that protect employees and insiders who expose corporate misconduct. This allows reputational damage to emerge more easily and deters unethical behavior. For example,

the U.S. Dodd-Frank Act includes whistleblower protections and financial rewards for reporting corporate fraud, which has led to significant reputational damage for companies caught in scandals.

3) Encouraging Investor and Consumer Awareness: Governments can promote ethical investment and consumer choice through eco-labeling, sustainability certifications, and financial regulations that highlight corporate responsibility. The SEC is increasing scrutiny on companies making false ESG claims, making reputational regulation more effective by reducing corporate “greenwashing” (*U.S. Securities and Exchange Commission, 2023*).

Second, governments may amplify the impact of reputational regulation by imposing legal or financial consequences on companies after reputational damage occurs. Governments often take legal action after public scandals emerge, reinforcing the impact of reputational regulation by holding corporations accountable. One example is the Volkswagen’s Dieseldieselgate scandal, where the company was accused of cheating emissions tests, which caused major reputational damage. Government agencies in the United States and European Union followed up with billions in fines, reinforcing the market’s reaction to the scandal (*Bertelli, 2021*).

Third, high-profile government hearings and investigations increase public scrutiny, making reputational regulation more effective. As an example, we can consider the United States Congressional Hearings on Big Tech (Meta [Facebook], Google, and X [Twitter]) regarding misinformation and data privacy amplified reputational damage, leading to regulatory changes in the industry.

Finally, governments may fine companies that make false sustainability claims or mislead the public (greenwashing). This strengthens reputational regulation by ensuring that companies cannot escape financial consequences. The United Kingdom’s Competition and Markets Authority (CMA), for example, has cracked down on companies making misleading “green” claims about their products, reinforcing reputational damage when deception is exposed (*Government of the United Kingdom, 2023*).

The Petroleum industry in the energy transition scenario is a perfect example of government intervention connected to reputational regulation. Oil and gas companies have long faced scrutiny for its environmental impact, especially regarding climate change, oil spills, and carbon emissions. While oil companies resisted major regulatory changes for decades, government actions have played a key role in strengthening reputational regulation, forcing these companies to adjust their strategies.

A key example of this is how the United States government and legal system amplified reputational pressure on ExxonMobil and other oil companies regarding climate change and environmental responsibility.

Starting in 2015, several U.S. states (e.g., New York, Massachusetts) sued ExxonMobil and other oil companies for deceiving investors and the public about climate risks, further amplifying reputational damage. From 2019 to 2021, congressional hearings on climate change were held publicly investigating ExxonMo-

bil and other oil companies for allegedly misleading the public about climate change, damaging their reputations.

From 2021, the U.S. Securities and Exchange Commission (SEC) increased scrutiny of misleading environmental claims by oil companies, making it harder for them to use public relations to manage reputational damage. During the Biden Administration, federal government investments in renewables and stricter regulations on fossil fuels signaled a shift away from oil, increasing public and investor pressure on the industry.

In 2021, ExxonMobil faced significant scrutiny following revelations from a whistleblower and undercover investigations that shed light on the company's internal perspectives and external communications regarding climate change (ExxonMobil, 2021).

That same year, an ExxonMobil lobbyist was secretly recorded by undercover climate activists. In the footage, the lobbyist described alleged efforts to undermine climate initiatives, to influence legislation and to downplay the company's public stance on climate change (NPR, 2023). These revelations intensified discussions about ExxonMobil's role in climate policy and its public communications.

These whistleblower revelations have prompted legal actions and investigations. For instance, the New York Attorney General issued a subpoena to ExxonMobil to investigate potential fraud related to its climate change disclosures (Climate Law Blog, 2015). Additionally, the SEC investigation into the alleged asset overvaluation underscores the regulatory scrutiny the company faces (CNBC, 2021).

The Petroleum industry has long been considered by public perception as the biggest villain of the potential success of the energy transition and, consequently, of the 6th wave of innovation.

The NGOs pressure to exclude fossil fuel companies from United Nations Framework Convention on Climate Change (UNFCCC) negotiations and official climate forums clearly shows that. These environmental organizations argue that fossil fuel interests represent a clear conflict with the goals of the Paris Agreement and broader climate mitigation efforts, highlighting that fossil fuel companies have historically lobbied against climate action, funded misinformation campaigns, and undermined international climate negotiations.

They advocate for rules similar to those in place for tobacco control under the World Health Organization Framework Convention, where industry actors are barred from influencing health policy due to alleged conflicts of interest.

Supporters of this exclusion argue that the presence of fossil fuel companies risks watering down climate commitments, delaying progress, and providing a platform for greenwashing. Critics, however, contend that excluding such relevant stakeholders may limit the dialogue necessary for a realistic and inclusive energy transition.

This debate underscores the tension between inclusivity and integrity in global

climate governance, and raises broader questions about stakeholder influence, transparency, and the role of public interest advocacy in shaping international policy.

According to Parella, the background of mistrust is the reason why the fossil fuel industry resorted to the creation of the Oil and Gas Climate Initiative (OGCI), which she considers to be an example of reputational regulation policy sanction. She suggests that negative public perception and pressure from stakeholders can lead to policy sanctions, where companies lose credibility and influence in policy-making processes due to their environmental impact.

The OGCI is a CEO-led consortium of 12 major oil and gas companies committed to leading the industry's response to climate change. Established in 2014, the initiative comprises 12 member companies: BP, Chevron, CNPC, Eni, Equinor, ExxonMobil, Occidental, Petrobras, Repsol, Saudi Aramco, Shell, and TotalEnergies. OGCI's members collectively represent over 30% of global operated oil and gas production.

OGCI aims to accelerate the reduction of greenhouse gas emissions in support of the Paris Agreement. Their strategies include improving energy efficiency, minimizing flaring, upgrading facilities, and co-generating electricity and useful heat.

In 2016, OGCI established OGCI Climate Investments, a fund committing over \$1 billion over ten years to invest in technologies and projects that lower carbon footprints in the oil and gas industry and other emitting sectors. OGCI has set a methane intensity target to reduce collective methane emissions, achieving a 9% reduction and aiming for further decreases by 2025.

Despite its commitments, OGCI has faced criticism from environmental groups accusing it of 'greenwashing.' Critics argue that the initiative's investments focus more on reducing emissions from fossil fuel production rather than transitioning to renewable energy sources.

Finally, in recent years, investors have publicly emphasized climate risk and started pressing oil companies to change or else risk divestment. Shareholder resolutions on climate issues, once rare, became common and receive substantial support. Many investors have simply reduced exposure to fossil fuels, influenced by both ethical considerations and the perception that the oil sector is in long-term decline in a decarbonizing world.

Notably, a 2023 report highlighted that 87 financial institutions worldwide have excluded thousands of companies for sustainability reasons, with fossil fuel producers being the most commonly excluded. This trend in investor behavior shows that reputational risk has become a financial risk (*Both Ends*, 2023).

7. The Trump Factor

While governments can strengthen reputational regulation, they can also weaken its effectiveness by protecting powerful industries or failing to enforce transparency. The capture theory, very well known in the traditional regulation, also applies in this case.

When industries influence government regulators, they may block or delay actions that would increase reputational scrutiny. Arguably, the fossil fuel industry has allegedly lobbied against climate disclosure requirements in some countries, potentially reducing the effectiveness of reputational regulation.

Even if transparency laws exist, weak enforcement means companies can avoid real consequences. Governments can defend certain industries against reputational damage by downplaying scandals or protecting companies from market consequences.

For example, some governments may continue to provide full unrestricted support for the oil and gas industry despite growing reputational concerns over climate change, making it harder for reputational regulation to force industry change. Therefore, while reputational regulation is primarily market-driven, government actions determine how effective it is in influencing corporate behavior.

The re-election of President Donald Trump has significant implications for global climate policy, particularly concerning the participation of fossil fuel companies in international climate negotiations. Historically, President Trump has been a proponent of fossil fuel expansion and has expressed skepticism about climate change initiatives. In his first term, he withdrew the United States from the Paris Agreement and promoted the use of coal and other fossil fuels at international forums (Worth, 2017).

In his second term, President Trump has continued to prioritize fossil fuel development. On January 20, 2025, he signed Executive Order 14,162, titled “Putting America First in International Environmental Agreements,” directing the immediate withdrawal of the United States from the Paris Agreement and related international climate commitments.

This stance aligns in theory with the interests of fossil fuel companies and may influence the broader discourse on their involvement in climate negotiations. Some oil companies are reassessing their renewable energy strategies due to financial returns and market conditions. For example, BP and Shell have scaled back their electricity generation ambitions, focusing instead on areas where they have a competitive advantage.

President Trump’s position may also embolden other nations or organizations to advocate for the inclusion of fossil fuel companies in climate discussions, arguing that their involvement is essential for a comprehensive approach to energy transition.

This could further polarize the debate on whether such companies should be part of the decision-making process in addressing climate change. In fact, fossil fuel companies control massive infrastructure, capital, and technological expertise. The transition to low-carbon energy requires their transformation. Excluding them will hinder practical progress.

Many companies are investing in carbon capture, low-carbon fuels, and renewable technologies. Engaging them could help align their operations with global climate goals, if done under strict transparency and accountability.

A pragmatic view suggests that solutions must involve current energy providers. Transitioning away from fossil fuels without their involvement could be slower, more chaotic, or even politically unfeasible in some countries. Participation could pressure companies to increase ambition, improve disclosure, and collaborate in shaping just transition pathways. Some argue it is better to have them at the table than working against climate policy in the background.

Fossil fuel companies are increasingly investing in the energy transition, allocating capital toward renewable energy projects, low-carbon technologies, and sustainability initiatives. These investments aim to diversify their portfolios and address the global shift toward cleaner energy sources.

BP has invested in bioenergy, electric vehicle (EV) charging infrastructure, renewable power, hydrogen, and carbon capture and storage (CCS). The company operates wind farms in the U.S. and has a significant stake in Lightsource BP, a solar energy developer. However, BP has recently reduced its planned green energy investments by over \$5 billion, indicating a strategic shift.

Shell has invested in renewable energy projects, including wind and solar, and has developed EV charging networks. Despite these efforts, only 8% of its recent spending has been on renewable energy, and the company has scaled back some ambitions in the electricity sector due to financial challenges (*Financial Times*, 2024).

ExxonMobil formed its Low Carbon Solutions division in 2022, focusing on lowering emissions in hard-to-decarbonize sectors through low-emission fuels, hydrogen, and CCS. The company plans to invest \$15 billion in lower-carbon initiatives and aims for carbon neutrality in its Scope 1 and Scope 2 emissions by 2050.

In 2023, clean energy investment by oil and gas companies reached \$30 billion, accounting for only 4% of the industry's overall capital spending. The pace and scale of their investments continue to be scrutinized in the context of global climate goals and the push for a more sustainable energy future (*International Energy Agency*, 2024).

At CERAWeek 2025, held in Houston, Amin H. Nasser, President and CEO of Saudi Aramco, delivered a keynote address emphasizing the need for a new global energy model that balances sustainability, security, and affordability (*Arab News*, 2025).

Nasser highlighted the shortcomings of existing energy transition plans, stating that despite nearly \$10 trillion in global spending over two decades, these efforts have not yielded the desired outcomes. Nasser called for an integrated strategy where both traditional and alternative energy sources play complementary roles in meeting rising global energy demand.

He argued that new energy sources should add to the energy mix rather than attempting to replace conventional sources entirely and stressed the necessity for investments across all energy sources and advocated for deregulation and unbiased financing to facilitate such investments globally.

Nasser emphasized that the new energy model should genuinely serve the needs of both developed and developing nations, particularly concerning technology access and warned that neglecting conventional energy sources in the transition process could lead to severe economic and energy security consequences, describing such an approach as a “fast track to dystopia”.

He underscored the importance of delivering real results that address the complexities of global energy demands while aligning with climate goals and called for a more pragmatic and inclusive approach to energy transition, recognizing the ongoing role of traditional energy sources alongside the development of renewable alternatives.

8. Conclusions

The 5th wave of innovation, often called the digital revolution, as proposed in long-wave economic theories (such as Kondratiev Waves), was driven by information technology (IT), the internet, and automation. It transformed industries by enabling global connectivity, data-driven decision-making, and digital business models.

Reputation in the 5th wave became a critical asset, influenced by digital transparency, online branding, and consumer engagement. Businesses and individuals had to adapt to new reputation dynamics, where digital presence, social media, and cybersecurity played significant roles.

In the internet-driven world created by the 5th wave, reputation is no longer controlled by companies or governments alone, it is shaped the general population, including consumers, influencers, search engines, and digital communities.

The 6th wave of innovation, on the other side, is characterized by sustainability-driven technologies and the transition to a green economy. It represents the green industrial revolution, where energy transition plays a central role, shaping industries, societies, and economies.

Therefore, while the 5th wave of innovation transformed reputation into a digital-first, data-driven asset, intensifying its effects over individuals, businesses and governments, in the 6th wave (Sustainability & Energy Transition) reputation became connected to climate leadership, ethics, and sustainable innovation.

In this sense, during the 6th wave the reputation of the Petroleum industry has been under intense scrutiny due to its role in climate change, environmental impacts, and energy security. As the world moves toward decarbonization and sustainability, oil and gas companies must carefully manage their reputations to maintain investor confidence, regulatory support, and public trust.

Similarly, reputation is a crucial asset for any government, as a government’s legitimacy and effectiveness often depend on how it is perceived by its citizens, international partners, and institutions. Managing reputation is essential for political stability, economic prosperity, and international influence.

That is where reputational regulation comes into play. Under this theory, reputations are assets that people and organizations seek to protect. Thus, when rep-

utation is threatened, parties are incentivized to act in ways that align with public expectations, including, but not limited to, companies and government. As explained in this article, reputational sanctions can, in some cases, be even more potent than direct financial or legal penalties.

After the 5th wave of innovation and considering the 6th wave, this theory became particularly relevant in connection with the Petroleum industry and energy transition. The energy transition requires significant policy and market shifts within a limited timeframe. However, traditional regulatory tools, such as command-and-control regulations, subsidies, and market-based instruments, often struggle to effectively support this transition due to their rigidity, slow adaptability, and limited scope.

Although reputational regulation is driven initially by external stakeholders rather than formal laws, as explained, it also encompasses traditional government-imposed regulations, financial and investor influence, climate litigation and lawsuits, boycotts and activist campaigns, among other regulatory tools. Therefore, the range of regulatory tools and implications of reputational regulation is much broader and, in many cases, more efficient.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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