

Briefing Note:
New Frontiers for Regulations in Science and Technology
from a Public Interest Perspective with a Focus on Regulatory Methods in Environmental
Protection and Artificial Intelligence
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BRIEFING NOTE:
**NEW FRONTIERS FOR REGULATIONS IN SCIENCE AND TECHNOLOGY FROM A PUBLIC INTEREST
PERSPECTIVE WITH A FOCUS ON REGULATORY METHODS IN ENVIRONMENTAL PROTECTION
AND ARTIFICIAL INTELLIGENCE**

PURPOSE

The purpose of this briefing note is to discuss new frontiers for regulations based on emerging trends in science and technology, and to outline the importance of regulatory policy development and implementation in these areas, as well as the challenges of managing the drivers for regulations from the public interest perspective. This will be explored with examples of regulatory methods for environmental protection, and a focus on artificial intelligence (AI) as an emergent computer technology that is poised to be adopted across multiple industries.

BACKGROUND

Innovation is a challenge where regulations must balance the private interests of industries with the public interest of citizens¹. Regulatory policy must protect the public from private interests that may have negative outcomes on society¹. Public protection is the focus of social regulations or risk regulations⁹, which formulates policies related to health, safety, security, and the environment⁶ that tends to align with public interest objectives⁴. Regulatory policies for the benefit of the public are the basis of the public interest or “normative” theory of regulations that represents one school of thought on regulatory policy development². This theory is based on the premise that regulators have the requisite knowledge and information to promote regulatory policies in favour of public interests, and that this is the principle aim of regulators². The second school of thought that regulation theory recognizes as driving regulatory policy is known as the private interest or “positive” school, which analyzes the actuality of how policy formulation occurs². This perspective assumes that regulators do not possess the requisite knowledge on industry metrics such as cost and demand², and therefore, are not engaged in ensuring public interest outcomes are maximized, rather they are involved in maximizing their own private interests and the private interests of powerful industry stakeholders⁵. This ensures the greatest benefit to private interest stakeholders, but this may be to the detriment of regulatory policy objectives¹. However, technological change promotes development and prosperity in society, so a careful balance between protecting the public from the potential negative effects of innovations and permitting the entry of novel technologies into the marketplace has allowed the advancement of society⁶. Innovations in science and technology have required regulatory professionals to develop and implement new regulatory policies for risk reduction³. The regulations may have the effect of either preventing or

stimulating technological innovation, and it may also prevent the innovation from market entry⁹.

CURRENT SITUATION

The current state of innovation has seen major developments in computer technology involving AI⁸ and there have also been developments related to environmental protection⁶ for combating the climate crisis. These areas are at the forefront due to their present and potential effects on industries and society^{7,9}, many of which have been highlighted by extensive media coverage. There are also significant concerns on what effects they will have on both private and public interest objectives, where they have major policy implications for the future. The regulatory approaches that address public interest goals such as environmental protection, may involve the implementation of technology-based regulations or performance-based regulations⁶. In the context of environmental quality, the former has requirements for industry to employ technologies to “clean” emissions from smokestacks for example, while the latter requires a set emissions target to be met⁶. In the case of AI, there is expansion of the industry at a remarkable speed that has implications for risk management regulations that need to be on pace with the speed of growth in this industry⁷. An article by Galaski J (2021) reported that simulations have shown that by 2030 around 70% of companies would have adopted AI technology in some form⁷. AI presents significant advantages across a multitude of industries in terms of the expediency of data collection and processing, as well as further potential developments that may become possible due to the use of AI⁷. However, AI is very complex and the challenge from the regulatory perspective is that there is still a lot of information asymmetry on all the potential outcomes associated with this technology⁷. With innovations in science and technology, the need for regulatory policy development and implementation are at the forefront to ensure public protections, while allowing users to benefit from the advantages that these technologies provide to both industries and society⁹. Hazard and risk assessments and a careful risk benefit analysis are needed to drive the development and implementation of new regulations. For example, the European Commission, Council of the European Union, and Parliament are currently drafting the final AI Act that will be used to deal with high risk uses⁸. This may not significantly influence what has been deemed lower risk and for more general uses by some, which involves the chatbot, ChatGPT that was created by OpenAI, a research group in the United States⁸. However, some are calling generative AI and large language models like ChatGPT, high risk due to their potential to be used to create misinformation, so this could be an area of inclusion in the final AI Act⁸. In addition, the European Commission is entrusted to create policies for cybersecurity, transparency, and risk management regulations for general purpose AI systems⁸. Therefore, using predictive data analysis to determine the potential outcomes in addition to the data available on the current outcomes of tested AI

systems must be used in the drafting of acts and regulations governing the use of AI moving forward.

KEY CONSIDERATIONS

The following key considerations present the drivers for regulations from the public interest perspective and contrasts this with the private interest goals of the innovators. How regulatory policy implementation and development are affected by these two opposing drivers of regulations will also be outlined here.

- New technology that is not limited by regulatory bureaucracy that seeks to mitigate the risks where limited risks are present, will allow new technologies into the marketplace⁹. These new developments may be superior to existing technologies because they may be safer with proven risk reduction and/or they may cause less environmental waste or pollution than the currently used technology⁹. In this case, private interest stakeholders must provide the informatics on risks versus benefits, and the development of regulatory standards to verify the risk reduction should be used to provide the confirmatory evidence that the novel technology is superior to the existing one. Therefore, regulations formulated to reduce risks should not prevent the entry of the new and safer technology into the marketplace. In this case, there are benefits from the public interest perspective because the new technology is associated with less risks than the former one.
- Performance-based regulations are superior to technology-based regulations in environmental protection⁶ and confer a greater advantage for public protection that supports public interest objectives. This is because performance-based regulations encourage industries to develop innovations to achieve regulatory targets for emissions standards⁶. They also allow industries to have the flexibility to choose the mechanisms to meet the regulated standards that may involve using less polluting materials and fuels in production⁹.
- Technology-based regulations that mandate the use of a particular technology such as employing scrubbers to “clean” emissions do not encourage a reduction in net emissions through the development of new technology^{6,9}. As a result, technology-based regulations favour private interests’ objectives, since developing and employing novel methods to reduce emissions may involve a change in infrastructure and investments in innovation that increases the cost to the industry. This cost factor may prevent industries from adopting performance-based methods to reduce pollution. Therefore, this does not support the objectives of social regulations from the public interest perspective.
- Performance-based regulations and technology-based regulations could both be employed to increase the safety of AI as well. Technology-based regulations that involve

the development of specific software to control or prevent negative outcomes may be used to mitigate risks to the public. Performance based regulations may then be employed within the framework of this software to monitor acceptable error percentages or deviations from the set performance standards to ensure standards are met. This will have private interest benefits where industries can validate the performance and function of AI integrated in their infrastructure and this will also benefit the public interest, because the public will be reassured that parameters are in place for safety.

- Regulations from a public interest perspective is important in AI to ensure public protection from biometric mass surveillance technologies that may violate data protection rights and the rights to privacy ⁷. This is because AI involves the use of algorithms for data collection, processing, and the storage of significant amounts of data ⁷. Biometrics may also be used to perpetuate inequality using this data if algorithms are used for racial profiling or in the hiring of employees based on these metrics ⁷. Therefore, from a public interest perspective there are many potential negative outcomes that may be propagated due to the use of AI, which warrants risk regulations and greater transparency on the nature of data collection to protect the public ⁷.
- The regulation of AI from the public interest perspective presents a huge challenge for regulators that are dealing with a lack of requisite knowledge of all the potential adverse effects and risk factors associated with the implementation of AI across many industries ⁷. This is due to the immense complexity of AI ⁸, and the fact that this is such a novel technology that will have far reaching effects, many of which have not been determined. As a result, there will be a significant time factor involved in collecting the necessary information for hazard and risk assessments to ensure that appropriate regulations to mitigate risks to the public are in place, especially where the risks are deemed detrimental to public safety and security ⁷.
- From a private interest perspective, AI provides major opportunities across a multitude of industries from healthcare to business, and education ⁷ in addition to many other fields. AI is capable of expedited decision making compared with human users and can engage in complex modelling and provide predictive data to facilitate these decisions ⁷. Therefore, there is cost savings to industries through the replacement of employees with AI systems ⁷. From a public interest perspective, the replacement of human workers has far-reaching negative socio-economic implications including the loss of employment opportunities creating a widening of the gap between the rich and the poor, and the resultant increase in poor health, homelessness, and crime.
- A proper risk classification based on the degree of risk is required to ensure adequate public protections. In the case of AI, ChatGPT has been deemed lower risk by some ⁸. However, AI systems that generate complex texts without human interventions to

determine the accuracy of the material should be considered high risk⁸. This is due to the huge potential for the propagation of misinformation if human supervision and structural editing of content is not employed to ensure the accuracy of the information that is produced by AI⁸. Misinformation can produce negative outcomes for the safety and security of the public and may have far reaching implications for certain members of society that may be targeted based on a multitude of factors such as race⁷, socioeconomic status, etcetera. Therefore, from a public interest perspective a detailed risk stratification or classification based on the significance of negative outcomes must guide policy development for risk management.

CONCLUSIONS

Regulatory policies will always be in flux in the face of technological innovation³. The regulatory affairs professional must possess an up-to-date knowledge base and must be actively engaged in ongoing education when involved in policy formulation in the science and technology fields where there is a rapid pace of change³. These regulations may involve both employing new technology to administer the regulations and regulations to manage the effects of a new technology⁹. The regulatory policies must be guided by both public interest that seeks public protections from technological risks and private interests that seeks to bring new technologies to the marketplace⁹. These novel technologies play a role in progress and advancement of society, and they may be associated with risk reduction in comparison with the currently employed technologies⁹. The role of the regulatory affairs professional is to engage in a comprehensive risk assessment, as well as considering the projected outcomes that adoption of the new technology will bring⁹. This will prove to be challenging with AI where there may be more unknown downstream effects than known effects, which requires close consultation with industry experts to gain greater insights into potential negative outcomes and creating a regulatory framework for risk mitigation⁷. Other outcomes that are not yet forecast will need to have regulatory policies formulated as these downstream effects are realized and where the implementation of regulatory standards is required to protect the public⁷. In contrast, the effects are clearer with environmental protection because pollutants can be quantified and adverse effects to health and safety are measurable parameters. This area of regulatory policy development is not subjected to the same degree of information asymmetry as AI. Here the development of the regulatory framework involves the use of technology to improve environmental conditions as well as specific regulations designed to mandate industry targets for reduced pollution^{6,9}. Both environmental protections to reduce climate change and AI will continue to remain key areas that will create new approaches to regulatory policy development. There will be continuous changes in these policies as these technologies evolve and the regulatory affairs professionals must evolve their approaches in concordance with these changes to maximize the benefits to both industries and society.

REFERENCES

1. Algonquin College. (2023). Public Interest Theories of Regulation. Retrieved April 1, 2023, from: <https://brightspace.algonquincollege.com/d2l/le/content/512237/Home>
2. Algonquin College. (2023). Two Schools of Thought. Retrieved April 1, 2023, from: <https://brightspace.algonquincollege.com/d2l/le/content/512237/Home>
3. Algonquin College. (2023). Challenges in the Future of Regulation. Retrieved April 1, 2023, from: <https://brightspace.algonquincollege.com/d2l/le/content/512237/Home>.
4. Algonquin College. (2023). Private Interest Theories of Regulation. Retrieved April 2, 2023, from: <https://brightspace.algonquincollege.com/d2l/le/content/512237/Home>
5. Dudley S.E, and Brito J. Chapter 2: Theories of Regulation: Why Do We Regulate? Regulation: A primer. (2012). Mercatus Center and George Washington University Regulatory Studies Center. Retrieved April 1, 2023, from: <https://www.mercatus.org/research/books/regulation-primer>
6. Dudley S.E, and Brito J. Chapter 7: Social Regulation: Health, safety, and Environment. Regulation: A primer. (2012). Mercatus Center and George Washington University Regulatory Studies Center. Retrieved April 1, 2023, from: <https://www.mercatus.org/research/books/regulation-primer>
7. Galaski J. (2021). AI Regulation: Present Situation and Future Possibilities. Retrieved April 2, 2023, from: <https://www.liberties.eu/en/stories/ai-regulation/43740>
8. Volpicelli G. (2023). Politico Pro. ChatGPT broke the EU plan to regulate AI. Retrieved April 5, 2023, from: <https://www.politico.eu/article/eu-plan-regulate-chatgpt-openai-artificial-intelligence-act/>.
9. Weiner J.B. The Regulation of Technology and the Technology of Regulation. Technology in Society 26. (2004), pp. 483-500. Retrieved April 1, 2023, from: http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=1960&context=faculty_scholarship