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SCIENTIFIC INNOVATION, SOCIETY, AND CULTURE: A SOCIO-LEGAL ANALYSIS OF TECHNOLOGICAL DEVELOPMENT, GOVERNANCE, AND PUBLIC POLICY

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ABSTRACT

The science and technological advancements profoundly transform social life, culture and governance by incorporating digital platforms in everyday communication, access to information and discussion. Current statistics verify this access: According to Pew Research Center, 84 per cent of Americans adults use YouTube and 71 per cent use Facebook, and DataReportal indicates 5.24 billion active social media users throughout the globe at the beginning of 2025 -94.2 per cent of internet users. This expansion increases the risk of misinformation, with 58 percent of the respondents in the Reuters Institute 2025 Digital News Report concerned about how to separately see accurate and inaccurate news online news (73 per cent of people in the U.S. and Africa). In this paper, we will examine the innovative ways through which such innovations upset social behaviors, undermine the cultural norms of trust and truth, and transform regulatory frameworks. It makes the case of a combined policy package that would integrate adaptive governance, digital literacy, platform responsibility, and rights-based regulation to achieve the benefits of innovation and solve inequalities, monopolies, and institutional distrust. Social impacts of science and technology are the concern of this paper especially in information and communication technology which influences the acceptability, sustainability and social desirability of the innovation process and products. It puts focus on attaining a sustainable balance between technological advancement and social change, in which the advantages of innovation could be maximized and the associated within-society hazards could be reduced. This requires a reconsideration of the policy frameworks so that scientific research and its practices can suit the requirements of society, especially in the unequal and heterogeneous societies where research priorities need not necessarily be the common good. Such a re-consideration should look into the natural back-lag in a legal system in the face of major and fast developing technological solutions and in many cases this would create a legal vacuum which would have to be filled by the legal system. Moreover, the inherent political character of the technological developmental inabilities also tends to present a dilemma based on the different cultural approaches, highlighting the lack of communication between the policymakers as well as the scientists.

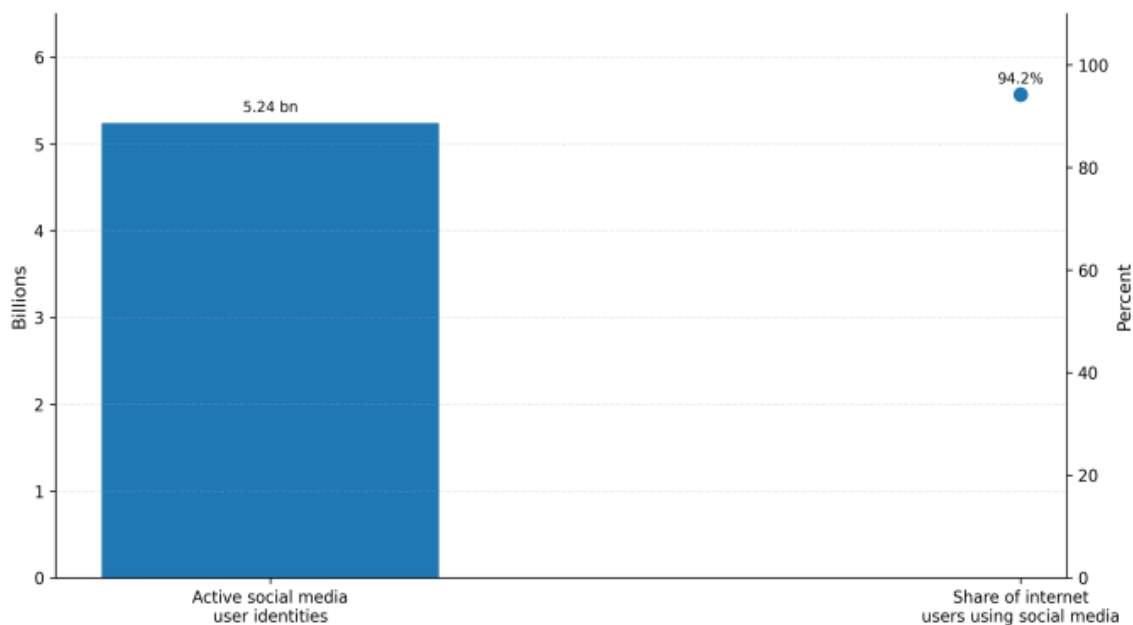
KEYWORDS: Scientific Innovation, Technology, Society, Culture, Law, Public Policy, Governance, Ethics

1. INTRODUCTION

Scientific innovation is not a mere technical activity; it is a social and cultural phenomenon that alters the way individuals act, communicate, consume information and assess authority. The growth of the social media, the algorithmic veil and the content creation supported by AI has heightened this change. The most popular social media platforms among the adult population in the United States are YouTube, Facebook, and Instagram, according to Pew Research Center, Tik Tok, WhatsApp, and Reddit are also popular (Jessica, 2025). Such adoption trends indicate that technology has integrated into the everyday social existence as opposed to being an expert tool. On the international front, DataReportal report statistics suggest that 5.24 billion active identities of social media users exist worldwide with social media penetrating 94.2% of internet users (Demir, 2025). This comprehensive domination of digital platforms in everyday life adds to the pressing necessity to comprehend the socio-legal impact context of technological development, and to establish the corresponding administration and state policy (Guerra, 2018). This rampant penetration of online platforms in everyday life highlights the pressing necessity to learn more about the socio-legal

consequences of the technological evolution and develop appropriate regulatory and citizen policies frameworks. It requires an active strategy of research and development and innovation paths, where the broader implications of society are taken into account beforehand, but not a focus only on application-specific considerations, but more of a focus on the underlying values, needs, and concerns of the society. This sometimes needs to seal the divide between scientific and social science investigations to promote unified methods of governing arising technologies to thereby reduce anti-modernization feelings (Trump *et al.*, 2023). This form of long-standing interrelation between the sciences and the social sciences is instrumental in the development of strong underpinnings to international science policy initiatives, particularly in areas with complicated cultural, political, and social differences. This picture is only becoming more complicated with the incorporation of novel technologies, such as AI, in everyday life as they are breaking down the pre-existing social order, may contribute to the increasing inequalities, and will require new forms of governance that will take into consideration the remodeled interplay between technological progressions and societal change.

Global Social Media Adoption in 2025



Source: DataReportal / Kepios, Digital 2025: the state of social media in 2025 and Global social media statistics.

Figure 1: Global social media adoption in 2025 (DataReportal/ Kepios, 2025).

2. DATA AND METHOD

The paper will utilize a descriptive socio-legal analysis, which will synthesize publicly available survey and industry data in official sources such as

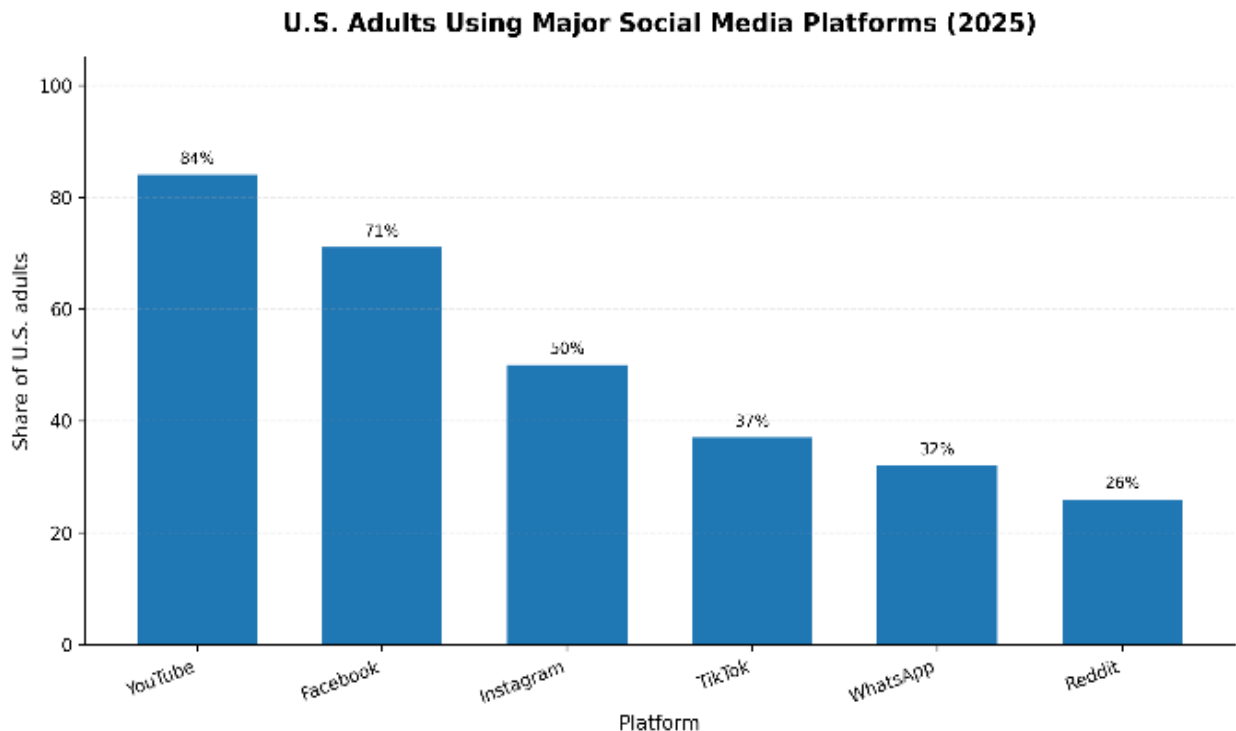
Pew Research Center, DataReportal/Kepios, and summaries of the 2025 Digital News Report by the Reuters Institute that have been uploaded by YouGov. This is especially appropriate to socio-legal

investigation, where it classifies consistent, up to date indicators into a policy-based story of the societal and cultural effects of innovation, in such a way as to avoid causal inference, which turns out to be highly evasive regarding the complex human involvement of the technology. Every figure is restricted to directly reported source information, maintaining transparency, reproducibility, and methodological rigor, and no artificial or fabricated observations were created. This is an approach that will allow a thorough evaluation of the changing legal environment of emergent technologies and the regulatory challenges that are occurring simultaneously. This involves the discussion of how new technologies find legal and ethical systems in constant flux and result in a circular regulation and innovation cycle.

3. SCIENTIFIC INNOVATION AND SOCIAL CHANGE

The frequency of concentration of platform usage on a few large services is presented in figure 2. YouTube and Facebook continue to overwhelmingly prevail, whereas Instagram, Tik Tok, WhatsApp, and Reddit are all home to very generous shares of the adult audience (Jessica, 2025). This trend has socio-legal implications since concentration of platforms may generate information asymmetries, lock-in forces and uneven bargaining power among the users and proprietary intermediaries making them more hazardous to consumer protection, social discourse, and democratic accountability (Guerra, 2018; Trump et al., 2023). The legal meaning of innovation is thus determined not only in the technology, but proactive control of data, attention and distribution to instill a degree of ethical acceptability, sustainability as well as integrating digital platforms into society (Guerra, 2018). This is seen in the omnipresence of smart phones, such as discussing how they are not only the tools, but forms of crucial conduct to participate in social, economic and political life, and this makes serious concerns of digital exclusion and the sustainability of current legal structures (Mattei, 2024). Such a rapid development requires that legal and ethical principles are re-examined constantly in order to deal with the issues emerging on a new

technological paradigm (Mazibrada, 2021). This re-evaluation may also take the form of a cyclical pattern whereby initial control measures are unable to remain abreast of the breakneck pace of technology and there is always an urgent need of flexible legal structures (Lescrauwaet et al., 2022; Mugurtay, 2025). This back and forth of technological advancement and regulatory reaction emphasizes the continued conflict between innovation and regulation which often requires extensive legal frameworks that may take on matters like digital hate speech, accountability by a platform and data management (Jurkovic, 2025; Sahak et al., 2025). It therefore becomes the difficult duty of policymakers to design frameworks of governing mechanisms, which can foresee possible risks, protect against the monopolistic practices, and create a setting that supports innovation, as well as to reduce risks related to such technologies (He et al., 2025). This is also more pronounced in the generative AI where platform governance systems are co-evolving concerning interconnected platforms, which point to the complex patterns on value and associate with privacy, engaging, and accountability (Su & Chan, 2025). This is a fine line which necessitates regulators to continuously evolve its frameworks in order to guarantee that not only the origin of the benefits of innovation is realized, but also that the risks which it may cause are appropriately mitigated (Lee, 2024). This will require a keen look into the model regulatory structures available to determine the appropriateness in the new technologies, with special focus on adaptable and receptive legal frameworks (Lescrauwaet et al., 2022). This frequently involves a shift out of sector-specific regulation to more horizontally integrated strategies that are able to capture the systemic impact of digital ecosystems (Mezei, 2025). These adaptive frameworks play a crucial role in dealing with the issue of pacing because the technology development rate exceeds the ability to regulate it, which might result in major issues in society and in ethical standards (Currie et al., 2025; Yeung, 2023).



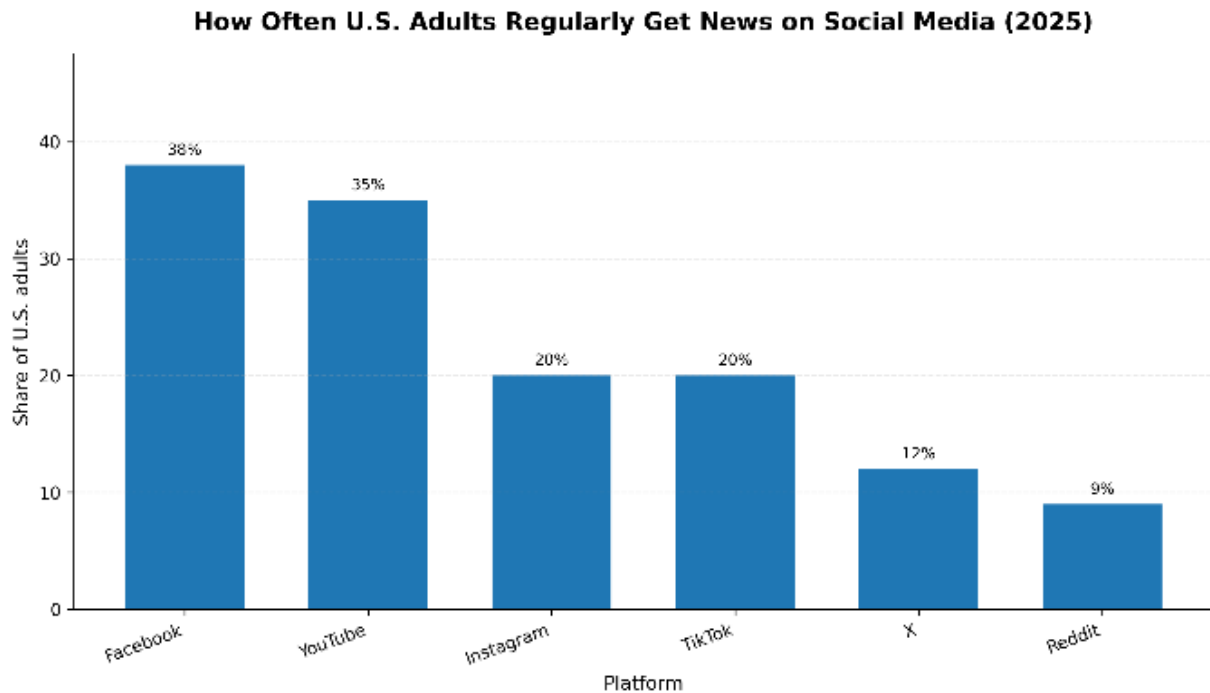
Source: Pew Research Center, Americans' Social Media Use 2025 (survey of U.S. adults, Feb. 5-June 18, 2025).

Figure 2: U.S. adults using major social media platforms (Pew Research Center, 2025).

4. CULTURE, NEWS CONSUMPTION, AND PUBLIC DISCOURSE

The use of social media in news consumption proves that technological innovation has turned out to be a cultural institution (Guerra, 2018). According to Pew Research Center, 38% of adults in the U.S. get news on Facebook on a regular basis, 35% on YouTube, 20% on Instagram and Tik Tok, and 12% on X and 9 percent on Reddit (Jessica, 2025). These trends show how platforms are now serving as portals to civic information, and not just a source of entertainment, establishing a pattern of platform concentration and escalating threats to develop a healthy discourse around the platforms (Trump et al., 2023). Due to the cultural meaning of news becoming less distinguishable by digital system architecture, making digital systems adaptively governable is necessary to eliminate information asymmetries and bring information to bear democratic responsibility, since it is the design of platforms that determines what becomes evident, shareable and to be boosted by algorithms (Guerra, 2018; Mezei, 2025). This requires the creation of strong governance systems that would strike a balance between allowing innovation and the need to ensure that basic rights and sound social space is

preserved (Sahak et al., 2025). The continued tectonic change in the law of digital media that has remained relatively the same since the 1990s is a reminder of the urgency of these adaptive governance strategies (Lubin & Gilbert, 2023). This is a regulatory lag where the policy making process fails to match with fast changes in technology which can cause serious disruption both in the society and the market (Ahern, 2025). As a result, there has been a growing call to implement an adaptive model of governance that shifts with changing technology and does not depend on pre-determined and mostly fixed regulations to deal with the complexity of the generative AI and other developing technologies (Reuel & Undheim, 2024). This involves the co-invention of governance framework, both governmental and corporate, to integrate the thought of specialism with the general population agreement, which fosters democratic governance and technological sustainability (Zhu et al., 2025). The collaborative model in question usually entails a combination of unobligating soft-law strategies and the strategic utilization of legal norms and tools to identify the roles and enforce moral standards in new spheres of technology (Allen et al., 2025).



Source: Pew Research Center, Social Media and News Fact Sheet (survey of U.S. adults, Aug. 18-24, 2025).

Figure 3: Regular news consumption on social media platforms among U.S. adults (Pew Research Center, 2025).

5. MISINFORMATION, TRUST, AND THE GOVERNANCE PROBLEM

The problem of governance is stiffer when the users are questioned to recognize false or misleading information. According to the summary of the 2025 Digital News Report by the Reuters Institute, 58% of respondents in the surveyed markets expressed concern in the ability to distinguish in the online news what is true and what is false; in the United States and Africa 73% and 46% respectively. Pew Research Center also reports that among the U.S. adults, just one-half believed that they placed some trust in national news organizations, as compared to seventy percent of the population who trusted local news organizations and thirty-seven percent of the population trusted social media websites. Collectively, these numbers indicate that innovation widens the access and also brings about greater uncertainty regarding truth, credibility and accountability. This loss of credibility, especially in the online forms of ministry, makes it difficult to identify and discuss societal issues as a community, thus makes it hard to affect politics (David et al., 2023). This has been exacerbated by the spread of false information accompanied by the ability of generative AI to generate convincing fake media undermining social capital and trust in the population (Taeihagh, 2025). This scenario

highlights the need to have strong governance systems that not only focus on the technical developments of AI but also pay attention to the socio-cultural effects on the information ecosystems and the democracies (Barus et al., 2025). This is a convoluted game in which polycentric governance models are required to incorporate various stakeholders and focus on participatory strategies of technology co-creation beyond the narrow, technocratic fixes on governance (Ulnicane, 2024). These models do not disregard the polyphonic character of AI governance because technological innovations, social priorities, and legal regulations are inseparable and should always be negotiated and adjusted. As an example, the fast development of AI, specifically in such sectors as the creation of synthetic media, requires governance approaches that consider both the existing issues and future uncertainties, as opposed to the use of outdated governance paradigms (Leibowicz, 2025). This situation is further complicated by the fact that the introduction of generative AI-based technologies into the realm of content generation allows creating highly realistic and customized fake information that can easily be confused with valid and fake information by ordinary people (Abbas et al., 2025; Jaidka et al., 2024).

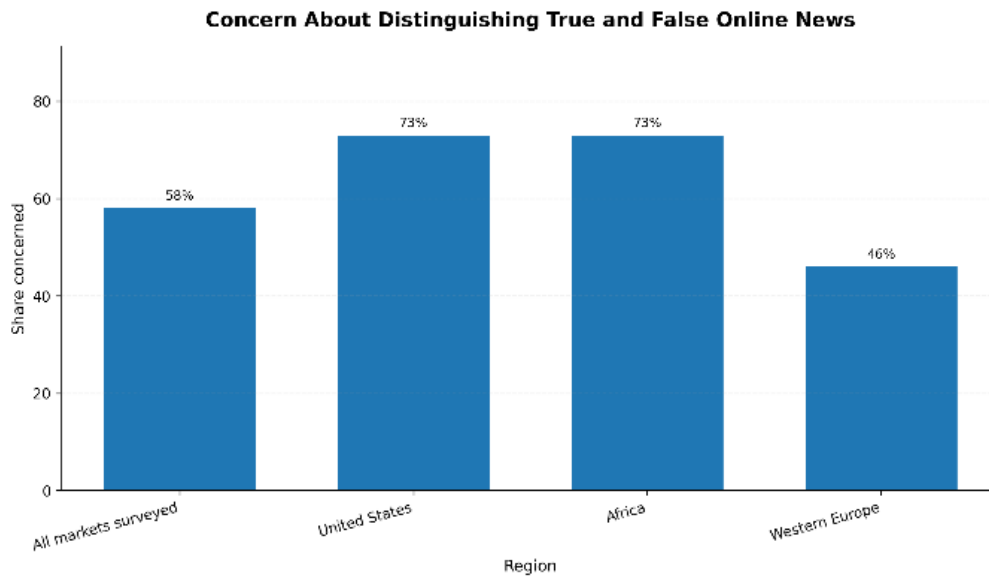
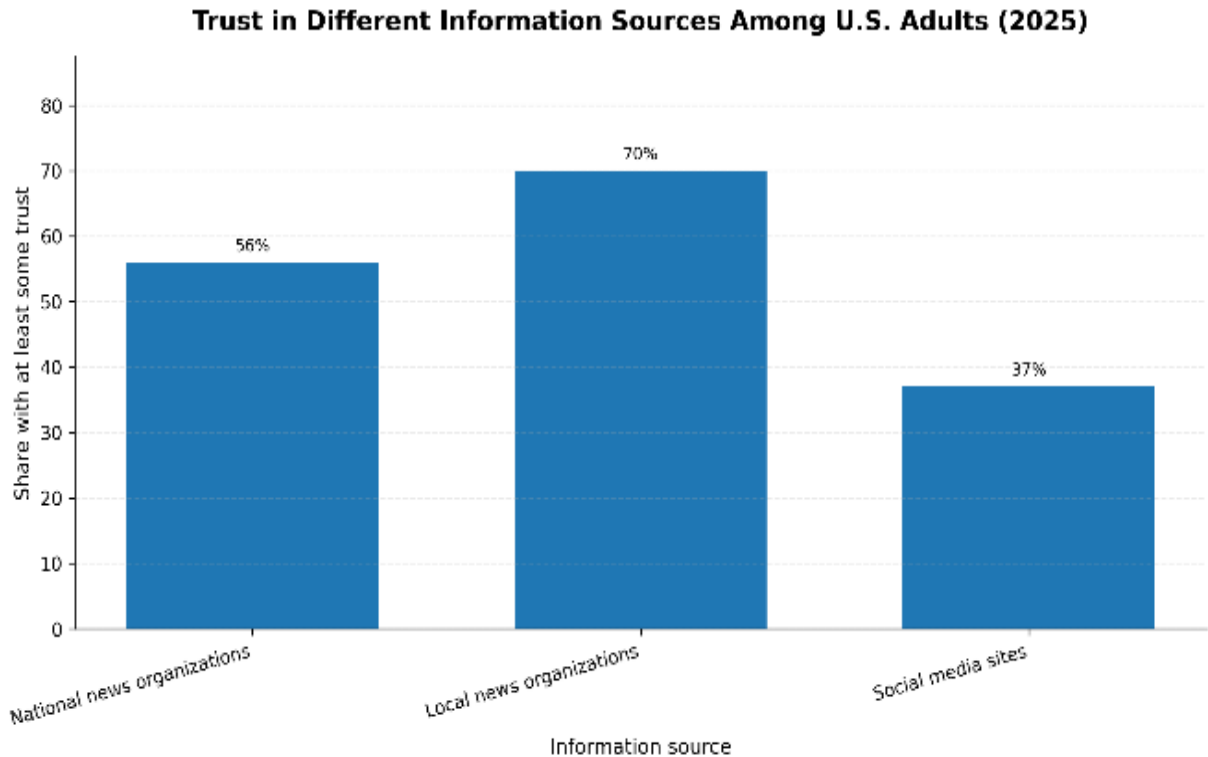


Figure 4: Concern about distinguishing true and false online news (Reuters Institute/YouGov, 2025).

6. LEGAL AND PUBLIC POLICY IMPLICATIONS

Socio-legal response must be multi-layered, relying on the adaptive governance model to adapt to the changing technology. First, the governments must place more transparency responsibilities on the platform, in which the recommendation algorithm platform defines the populace conversation by presenting information out of context and enhancing potential dangers, because algorithmic curation regularly favors the sensational content (Jurkovic, 2025). Second, the data protection and consumer-protection laws, say the GDPR and the DSA, should be revised to reflect the informational capacity of digital intermediaries, with *ex ante* responsibility to respond to market power and fundamental rights imposed (Mezei, 2025). Third, digital literacy needs to be prioritized as a matter in public-policy due to the fact that the issue of misinformation has now become wide-ranging in terms of regions, thus a need to educate the populace to increase their awareness and form a protection mechanism against synthetic media. Fourth, regulators ought to promote competition and interoperability in order to make cultural and civic life not concentrated on limited platforms which will reduce the effect of platform concentration and promote the existence of a healthy public sphere. Such measures do not imply that hostility to innovation is necessary, instead it is safeguarding innovation to be democratic and compliant to cultural pluralism and involves collaborative, polycentric structures that includes various stakeholders. This requires a sustained

review of legal systems in order to maintain their integrity even though adjusting to new conditions created by new technologies, including the ubiquitous role of AI-created content. Moreover, the instrumentalization of the digital media infrastructure by large corporations, where knowledge and communication are treated as an instrument to be controlled, demands that tough legal intervention should be developed to create epistemic diversity and counter the expansion of synthetic content. This involves revising the legal systems to cope with the issues that generative AI present, so that the protection of data, information security, and responsibility mechanisms should be established in order to allow the use of these technologies without abusive practices. The purpose of such structures should be to address the dangers put forth by AI-based disinformation, especially by incorporating a framework that would expand the accountability of platforms, as well as encourage the research of computational social sciences to comprehend and avert bias and misinformation. It means that this strategy requires a dedication to creating media literacy so that individuals can be provided with the means to evaluate the credibility and the purpose of the information they have been exposed to. Additionally, clear statements about content provenance and traceability that may be enforced by a regulatory system would considerably contribute to the detection and prevention of the transmission of the AI-generated misinformation (Minssen *et al.*, 2025).



Source: Pew Research Center, How Americans' trust in information from news organizations and social media sites has changed over time (Oct. 29, 2025).

Figure 5: Trust in information sources among U.S. adults (Pew Research Center, 2025).

7. CONCLUSION

We face a new form of scientific innovation where society is being transformed by platform concentration, social-networked news consumption, and an intensification of the worries over misinformation that is driven by synthetic media. Based on the data points in Figures 4 and 5, the statistics indicate the enormous adoption and immensely low trustworthiness levels, e.g., 56 percent of adults in the U.S. trust the national news organization, which is half as compared to local news. There should be a long-lasting policy reaction, which enchant multi-layered adaptive regulation, and rights-based control of market dominance and fundamental rights, and population education on digital literacy. Indeed, this strategy will guarantee innovation is aligned with the democratic entity of trust, cultural pluralism, and resistance to AI-enabled disinformation by adopting polycentric governance frameworks that will bring on board multiple stakeholders. This all-encompassing structure recognizes the qualitative change brought about by generative AI, especially its capacity to undermine a common epistemic foundation and disrupt the traditional concept of trustworthiness.

This, in turn, makes the introduction of solid legal and policy frameworks, including data protection, cybersecurity, and accountability standards the most crucial aspect to respond to the threats of generative AI. This will necessitate an aggressive approach, that goes beyond making improvements on the current practices, to find a new direction of addressing the challenges that can be presented by the current and new threats that high-tech AI systems have on the current and future settings. Moreover, making people digitally literate by learning about it is an essential measure to equip them to challenge information and avoid being manipulated by the AI-constructed pseudo-reality. This encompasses creation of industry-focused policy principles and assessment indicators to control the positive and the negative spread of AI-generated information, as well as the requirements of transparency including Article 52 under the draft EU AI Act. These types of anticipatory impact evaluations are essential in shaping policy-making mechanisms because they could indicate the adverse impacts that generative AI may cause, and thus considerate lawmakers in making sound governance policies.

REFERENCES

1. Abbas, F., Chesterman, S., &Taeihagh, A. (2025). Building trust in the generative AI era: a systematic review of global regulatory frameworks to combat the risks of mis-, dis-, and mal-information. *AI & Society*. <https://doi.org/10.1007/s00146-025-02698-9>
2. Ahern, D. (2025). The New Anticipatory Governance Culture for Innovation: Regulatory Foresight, Regulatory Experimentation and Regulatory Learning. *European Business Organization Law Review*, 26(2), 241. <https://doi.org/10.1007/s40804-025-00348-7>
3. Allen, D. S., Hubbard, S. M., Lim, W., Stanger, A., Wagman, S., Zalesne, K., &Omoakhalen, O. (2025). A roadmap for governing AI: technology governance and power-sharing liberalism. *AI and Ethics*, 5(3), 3355. <https://doi.org/10.1007/s43681-024-00635-y>
4. Barus, O. P., Hidayanto, A. N., Handri, E. Y., Sensuse, D. I., &Yaiprasert, C. (2025). Shaping generative AI governance in higher education: Insights from student perception. *International Journal of Educational Research Open*, 8, 100452. <https://doi.org/10.1016/j.ijedro.2025.100452>
5. Currie, W. L., Schlagwein, D., Leimeister, J. M., & Willcocks, L. (2025). Rethinking technology regulation in the age of AI risks. *Journal of Information Technology*, 40(3), 236. <https://doi.org/10.1177/02683962251378815>
6. David, C., Casilli, A. A., Delanoë, A., Rosnay, M. D. de, Gelder, B. de, Frau-Meigs, D., Jouve, B., Dana, D., Amor, N. B., Boros, A., Brunori, M., Brites, M. J., Caldarelli, G., Datchary, C., Fassi, L., Hernandez, L. L., Nowak, A., Víctor, R.-D., Slater, M., ... Chavalarias, D. (2023). Toward a Research Agenda on Digital Media and Humanity Well-Being. HAL (Le Centre Pour La Communication ScientifiqueDirecte). <https://hal.science/hal-04091733>
7. Demir, G. (2025). YOUTH BEYOND THE SCREEN: A CRITICAL APPROACH TO DIGITAL MEDIA AND YOUTH DISCOURSES. *DergiPark* (Istanbul University). <https://dergipark.org.tr/en/pub/ibadergi/issue/94137/1748898>
8. Guerra, G. (2018). An Interdisciplinary Approach for Comparative Lawyers: Insights from the Fast-Moving Field of Law and Technology. *German Law Journal*, 19(3), 579. <https://doi.org/10.1017/s2071832200022793>
9. He, Y., Cai, Y., Zhao, H., & Wang, Z. (2025). Regulatory Innovation for Digital Platforms in the Data-Intelligence Era and Its Implications for E-Commerce. *Journal of Theoretical and Applied Electronic Commerce Research*, 21(1), 2. <https://doi.org/10.3390/jtaer21010002>
10. Jaidka, K., Chen, T., Chesterman, S., Hsu, W., Kan, M., Kankanhalli, M., Lee, M. L., Seres, G., Sim, T., Taeihagh, A., Tung, A. K. H., Xiao, X., & Yue, A. (2024). Misinformation, Disinformation, and Generative AI: Implications for Perception and Policy. *Digital Government Research and Practice*, 6(1), 1. <https://doi.org/10.1145/3689372>
11. Jessica, R. (2025). Social media users' perceptions of roles and responsibilities. In Portuguese National Funding Agency for Science, Research and Technology (RCAAP Project by FCT). <http://hdl.handle.net/10400.14/54159>
12. Jurkovic, M. (2025). THE INFLUENCE OF SOCIAL MEDIA AND DIGITAL PLATFORMS ON SME BUSINESS. *The Journal of International Legal Communication*, 17(2), 7. <https://doi.org/10.32612/uw.27201643.2025.17.2.pp.7-28>
13. Lee, L. (2024). Enhancing Financial Inclusion and Regulatory Challenges: A Critical Analysis of Digital Banks and Alternative Lenders Through Digital Platforms, Machine Learning, and Large Language Models Integration. *arXiv (Cornell University)*. <https://doi.org/10.48550/arxiv.2404.11898>
14. Leibowicz, C. R. (2025). Regulating Reality: Exploring Synthetic Media Through Multistakeholder AI Governance. *arXiv (Cornell University)*. <https://doi.org/10.48550/arxiv.2502.04526>
15. Lescauwat, L., Wagner, H., YOON, C. Y., & Shukla, S. (2022). Adaptive Legal Frameworks and Economic Dynamics in Emerging Tech-nologies: Navigating the Intersection for Responsible Innovation. *Law and Economics*, 16(3), 202. <https://doi.org/10.35335/laweco.v16i3.61>
16. Lubin, N., & Gilbert, T. K. (2023). Accountability Infrastructure: How to implement limits on platform optimization to protect population health. *arXiv (Cornell University)*. <https://doi.org/10.48550/arxiv.2306.07443>
17. Mattei, U. (2024). False Conscience: Sustainability and Smart Evolution—Between Law and Power. *International Journal for the Semiotics of Law - Revue Internationale de SémiotiqueJuridique*, 37(5), 1557. <https://doi.org/10.1007/s11196-024-10116-4>

18. Mazibrada, A. (2021). On the Right to Science As a Cultural Human Right. In Cambridge University Press eBooks (p. 107). Cambridge University Press. <https://doi.org/10.1017/9781108776301.008>
19. Mezei, K. (2025). Governing Digital Ecosystems in the EU: A Coordinated Regulatory Approach. *Dot.Pl*. <https://doi.org/10.60097/dotpl/215839>
20. Minssen, T., Smith, H. J., Mann, S. P., García, A. M., & Negrete, J. (2025). THE EUROPEAN AI ACT: PROMISES, PERILS & TRADE-OFFS IN A COMPLEX REGULATORY ECOSYSTEM. *Research Portal Denmark*, 1, 330. <https://local.forskningportal.dk/local/dki-cgi/ws/cris-link?src=ku&id=ku-2fbecc26-4adb-487a-92d7-469ae5a7b774&ti=THE%20EUROPEAN%20AI%20ACT%20%3A%20PROMISES%2C%20PERILS%20%26amp%3B%20TRADE-OFFS%20IN%20A%20COMPLEX%20REGULATORY%20ECOSYSTEM>
21. Murguray, N. (2025). The Janus Face of Innovation: Global Disparities and Divergent Options. *arXiv (Cornell University)*. <https://doi.org/10.48550/arxiv.2503.07676>
22. Reuel, A., & Undheim, T. A. (2024). Generative AI Needs Adaptive Governance. *arXiv (Cornell University)*. <https://doi.org/10.48550/arxiv.2406.04554>
23. Sahak, S., Rajamanickam, R., & Hassan, M. S. (2025). Liability of internet intermediaries and legal challenges: a comprehensive systematic review. *Quality & Quantity*. <https://doi.org/10.1007/s11135-025-02344-y>
24. Su, C. C., & Chan, N. K. (2025). Assembling platform governance as private ordering in the age of generative AI: platform interdependence in policy evolution. *Information Communication & Society*, 1. <https://doi.org/10.1080/1369118x.2025.2513672>
25. Taeihagh, A. (2025). Governance of Generative AI. *Policy and Society*, 44(1), 1. <https://doi.org/10.1093/polsoc/puaf001>
26. Trump, B. D., Cummings, C. L., Klasa, K., Galaitsi, S., & Linkov, I. (2023). Governing biotechnology to provide safety and security and address ethical, legal, and social implications. *Frontiers in Genetics*, 13. <https://doi.org/10.3389/fgene.2022.1052371>
27. Ulicane, I. (2024). Governance fix? Power and politics in controversies about governing generative AI. *Policy and Society*, 44(1), 70. <https://doi.org/10.1093/polsoc/puae022>
28. Yeung, K. (2023). Dispelling the Digital Enchantment: how can we move beyond its destructive influence and reclaim our right to an open future? *Prometheus*, 39(1). <https://doi.org/10.13169/prometheus.39.1.0008>
29. Zhu, Y. P., Liang, S., Zou, Y., & Park, H. W. (2025). Regulation and innovation: Unveiling the quadruple-helix-innovation ecosystem of generative AI. *Information Processing & Management*, 63(3), 104549. <https://doi.org/10.1016/j.ipm.2025.104549>