Global Scientific and Academic Research Journal of Economics, Business and Management
ISSN: 2583-5645 (Online)
Frequency: Monthly
Published By GSAR Publishers
Journal Homepage Link- https://gsarpublishers.com/journals-gsarjebm-home/

The Chaordic 'Chips War': How AI's Energy Crisis Will Reshape Global Law, Policy and Your Business

By

Olubukola (Buki) Ogunsakin 2025

Article History

Received: 20/09/2025
Accepted: 27/09/2025
Published: 29/09/2025

Vol –4 Issue – 9

PP: -60-69

Abstract

In the contemporary artificial intelligence (AI) landscape, rapid technological advancement introduces novel and complex risks. The breakneck pace of innovation has outstripped the capacity for governance, giving rise to critical challenges in semiconductor supply chains, unsustainable energy consumption, and significant regulatory gaps. The explosive growth of AI is precipitating a silent yet profound energy crisis. As the technology proliferates at an astronomical rate, the immense computational horsepower required to train and operate large-scale AI systems is placing unsustainable demands on global power grids, natural resources, and geopolitical stability. This paper contends that these pressures represent more than a mere technical impediment; they constitute a central battleground that will redefine policy and commerce.

The analysis focuses on three critical domains: global law and policy, business and economics, and environmental sustainability. The principal contribution of this work is its exploration of emergent issues, including the weaponization of trade, the divergence between energy-advantaged and energy-constrained entities, associated geopolitical tensions, the AI sector's escalating carbon footprint, and the resulting regulatory flashpoints. By examining the necessity for legal and governance systems to evolve in response, this paper concludes that addressing this convergence of challenges—termed here as the "Chips War"—demands an urgent and multidisciplinary response.

Keywords: *Artificial intelligence, chips, energy, climate*

I. INTRODUCTION

AI is becoming the jewel of contemporary technology.[1] Yet, beneath this promise of efficiency lies a paradox worthy of attention: AI carries significant weight as it is a material enterprise that consumes a vast amount of energy, largely due to its reliance on semiconductor supply chains.[2] Thus, in the truest sense, AI is not just about algorithms and fanciful innovations; it concerns the matter of electricity grids and silicon wafers.[3]

To have a better understanding of this, think of the amount of energy modern AI systems consume. A single system run will consume electricity equivalent to powering a street on the mainland in Nigeria for one week. According to the International Energy Agency, a single request made through ChatGPT, an AI-based virtual assistant, consumes 10 times the electricity of a standard Google Search.[4] Therefore, as AI seeps into our everyday lives, what is certain is that the energy curve is expected to rise to meet the demands. To this end, the

[1] *Xu, Y., Wang, F., & Zhang, T. (2024). Artificial intelligence is restructuring a new world. Innovation, 5(6), 100725. https://doi.org/10.1016/j.xinn.2024.100725*

[2] *Husein, M., Rajagukguk, J. R., & Putranto, K. (2024). The role of artificial intelligence in improving the efficiency of the company's supply chain. International Journal of Engineering Science and Information Technology, 4(4), 156–172. https://doi.org/10.52088/ijesty.v4i4.596*

[3] *Wang, Q., Li, Y., & Li, R. (2025). Integrating artificial intelligence in energy transition: A comprehensive review. Energy Strategy Reviews, 57, 101600. https://doi.org/10.1016/j.esr.2024.101600*

[4] *Salathé, M. (2023, November 15). Does ChatGPT use 10x more energy than a standard Google search? A journey down the rabbit hole of viral AI energy claims. Engineering Prompts. https://engineeringprompts.substack.com/p/does-chatgpt-use-10x-more-energy*

*Corresponding Author: **Olubukola (Buki) Ogunsakin.**

emerging niche of artificial intelligence has become a matter of energy policy that demands urgent attention.

The other half of the equation is the issue of the dependency on semiconductors. This is because if energy is called the lifeblood of AI, then semiconductors are the nervous system.[5] Moreover, chips are instruments used by the AI economy that cannot be dispensed with.[6] Unfortunately, the production of high-performance chips is limited to the arena of world geography and politics, with some companies in East Asia and the United States holding something close to a monopoly of the market.[7] You can think of these chips as the "new crude oil"; they are scarce, they are invaluable, and have been weaponised in global trade.

These realities have gone far beyond the reach of regulatory frameworks, owing to the fact that AI has an insatiable demand for electricity, and it equally relies on semiconductors.[8] To this end, laws are now compelled to address these challenges. For businesses too, thinking outside the box has now become an indispensable strategy.

The crux of the examination in this article is that the age of AI has gone beyond just innovation, instead it has caught up with the demands of energy and the fragilities attached to the supply chain.[9] And as it will be seen in the course of the research, the chips war is no longer a scenario expected to happen in the future; it is already here.

II. ENERGY DEMANDS AND SEMICONDUCTOR SCARCITY: THE CRISIS EXPLAINED

A. AI Energy Footprint

AI has recently been imagined as an invisible force that determines our day-to-day lives.[10] This may be true in the innovation sense, but in the demands of energy, every query sent to AI, every algorithm predicted, and every machine-learning model leaves a demand on the world's electricity.[11]

According to the IEA,[12] there is no AI without energy, specifically electricity for data centres. Widespread use of AI will fundamentally reshape the energy industry's operations. Take GPT-3, for instance, one of the most well-known language models. According to a study,[13] its training process alone consumed an estimated 1,287 MWh of electricity, equivalent to the annual energy use of 120 average American households. Aside from this fact, the day-to-day running of AI also relies on networks of data centres.[14]

Data centres are not left out of the demand for electricity.[15] They are cooled by ventilation systems that need electricity that works around the clock.[16] Moreover, what cannot be ignored is the fact that AI's carbon emission is also a subject of debate in today's world,[17] and if the world will take the issue of climate neutrality seriously, the question is asked: Can it afford the growth of energy-intensive AI? Does this dilemma keep regulators on their feet to balance the demands of innovation viz a viz what is really happening in the world of climate obligations?

B. The Geopolitics of Chips

As said earlier, if energy is the fuel of AI, then semiconductors are the engine, and these engines are dangerously concentrated.[18] Advanced chips like GPUs and AI accelerators are produced by a few companies in the world.[19] The dynamics of this clustering can be pictured as a chokepoint in the global economy.

The COVID-19 pandemic, exposed how delicate in nature the supply chain of chips can be.[20] During this time, factories

---

[5] *Qian, Y., Alhaskawi, A., Dong, Y., Ni, J., Abdalbary, S., & Lu, H. (2024). Transforming medicine: Artificial intelligence integration in the peripheral nervous system. Frontiers in Neurology, 15, 1332048. https://doi.org/10.3389/fneur.2024.1332048*

[6] *Judge, B., Nitzberg, M., & Russell, S. (2025). When code isn't law: Rethinking regulation for artificial intelligence. Policy and Society, 44(1), 85–97. https://doi.org/10.1093/polsoc/puae020*

[7] *Ibid*

[8] *Krishnamohan, A. (2025, May 29). Semiconductors & AI: 2024's industry transformation unveiled. TechFunnel. https://www.techfunnel.com/fintech/ft-growth-hacks/semiconductors-ai-2024-transformation/*

[9] *Greene-Dewasmes, G., & Tladi, T. (2025, January 21). AI's energy dilemma: Challenges, opportunities, and a path forward. World Economic Forum. https://www.weforum.org/stories/2025/01/ai-energy-dilemma-challenges-opportunities-and-path-forward/*

[10] *Keenan, V. (2025, July 30). The invisible force determining your AI future: Understanding data gravity. Salesforce DevOps. https://salesforcedevops.net/index.php/2025/07/30/the-invisible-force-determining-your-ai-future-understanding-data-gravity/*

[11] *Rokon, A. (2022). Prospects of ML on electricity demand forecasting: Introducing AI to the national grid for the best predictive modelling (Master's thesis, Applied Statistics and Data Science). ResearchGate. https://doi.org/10.13140/RG.2.2.29791.78247*

[12] *International Energy Agency. (2025, April 10). Energy and AI. https://www.iea.org/reports/energy-and-ai*

[13] *Alex de Vries. The growing energy footprint of artificial intelligence. Oct 2023. CellPress, Joule, Volume 7, Issue 10. https://doi.org/10.1016/j.joule.2023.09.004*

[14] *Mavani, C., Mistry, H., Patel, R., & Goswami, A. (2024). Artificial intelligence (AI) based data center networking. International Journal on Recent and Innovation Trends in Computing and Communication, 12(2), 508–518.*

[15] *Ibid*

[16] *Ibid*

[17] *Shumskaia, E. I. (2022). Artificial intelligence—Reducing the carbon footprint? In Industry 4.0, fighting climate change in the economy of the future (pp. 365–378). Springer. https://doi.org/10.1007/978-3-030-79496-5_33*

[18] *Rasheed, M. Q., Yuhuan, Z., Nazir, M., Ahmed, Z., & Yu, X. (2025). How do semiconductors, artificial intelligence, geopolitical risk, and their moderating effects shape renewable energy production in leading semiconductor manufacturing countries? Technology in Society, 80, 102761. https://doi.org/10.1016/j.techsoc.2024.102761*

[19] *Mo, L., & Potkin, F. (2025, August 19). Exclusive: Nvidia working on new AI chip for China that outperforms the H20, sources say. Reuters. https://www.reuters.com/world/china/nvidia-working-new-ai-chip-china-that-outperforms-h20-sources-say-2025-08-19/*

[20] *Ochonogor, K. N., Osho, G. S., Anoka, C. O., & Ojumu, O. G. (2023). The COVID-19 pandemic and supply chain disruption: An analysis of the semiconductor industry's resilience. ResearchGate. https://www.researchgate.net/publication/368190282_The_COVID-*

*Corresponding Author: **Olubukola (Buki) Ogunsakin.**

producing automobiles were stalled, prices for consumer electronics soared, and the government realised the consequences of relying on just few suppliers.[21] Now, the AI era comes with its own vulnerability. Chips are no longer regarded as just components attached to gadgets; they are now assets that determine economic growth and even national security.[22]

Moreover, the scarcity of semiconductors did not happen by accident.[23] Manufacturing them requires capital, high-skilled labour, and precision engineering.[24] The high barrier to entry explains why the industry is still concentrated in only selected jurisdictions.[25] What this also means is that chips have become tools used for geo-economic competition; that is, export bans and supply-chain alliances are the new weapons states use.[26]

For businesses, what this scarcity means is higher costs and supply delays. A start-up that wants to build an AI product may be constrained by the inability to access enough GPUs, and even as a matter of fact, large corporations are not left out, as they are also caught in the need for the supply of chips years in advance.

II. REGULATORY FLASHPOINTS IN COMPARATIVE PERSPECTIVE

AI's high demand for energy and the scarcity of chips have not gone unnoticed.[27] Sadly, instead of producing a single global response, countries have resorted to semi-selfish policies in regional and national blocs.[28] This is a risk that determines investment. Against this background, the instant section will examine the different countries of the world and their stance on the chips war.

A. The United States and Its Strategic Restrictions

In the US, the "chips war" is almost synonymous with national security, and this can be seen in the promulgation of the CHIPS and Science Act (2022).[29] The Act authorises roughly $280 billion in new funding to boost research and manufacturing of semiconductors in the United States.[30] Palpably, conceived to eventually exterminate the US' dependency on foreign suppliers.[31]

Not only that, the United States has also been tightening semiconductor export controls with strict licensing policies, stricter controls on major Chinese entities like Huawei, and expanded military end-user controls to cover a wider range of Chinese companies, research institutions, and technology sectors deemed a threat to national security, all based on the grounds of strategic risks.[32] These restrictions bring consequences for international companies[33] and one of the consequences is that a company in Taiwan that manufactures chips may be barred from selling its products to Chinese firms if it is confirmed that US technology was used in their production. Therefore, American law is shaping a business model that foreign firms do not have a choice but to adhere to.

In the same vein, there are antitrust regulators in Washington now who are concentrating on the chip industry.[34] Nvidia's dominance and its performance in GPUs is an example that raises the need to strike a balance between competition and innovation.[35] Therefore, for firms that rely on chips produced by Nvidia, it is uncertain whether future actions will likely disrupt their supply chains.[36]

B. The European Union: Innovation and Regulation

The EU takes a different route from the above, grounded in its rights-based regulation. The AI Act, now in its final stages – fully effective from August 2, 2026, imposes obligations which may be stringent on developers and deployers of AI systems.[37] Though the Act does not focus on energy or chips

19 Pandemic and Supply Chain Disruption An Analysis of the Semiconductor Industry's Resilience

[21] *Ibid*

[22] *Flamm, K., & Bonvillian, W. B. (2025, February 20). How Intel's innovation problem became a national security crisis. American Affairs Journal, 9(1). https://americanaffairsjournal.org/2025/02/how-intels-innovation-problem-became-a-national-security-crisis/*

[23] *Ibid*

[24] *Krzywdzinski, M. (2017). Automation, skill requirements and labour-use strategies: High-wage and low-wage approaches to high-tech manufacturing in the automotive industry. New Technology, Work and Employment, 32(3), 247–267. https://doi.org/10.1111/ntwe.12100*

[25] *Ibid*

[26] *Zhao, Y. (2025). What has the chip war brought to China's chip market? International Journal of Social Sciences and Public Administration, 6(2), 169–192. https://doi.org/10.62051/ijsspa.v6n2.21*

[27] *de Vries-Gao, A. (2025). Artificial intelligence: Supply chain constraints and energy implications. Joule, 9(6), 101961. https://doi.org/10.1016/j.joule.2025.101961*

[28] *Ibid*

[29] *Germann, J., Rolf, S., Baines, J., & Starrs, S. K. (2024). A chip war made in Germany? US techno-dependencies, China chokepoints, and the German semiconductor industry. Politics and Governance, 12, 1–20. https://doi.org/10.17645/pag.8265*

[30] *Taylor, M. (2023). The US CHIPS and Science Act of 2022. MRS Bulletin, 48(9), 678–686. https://doi.org/10.1557/s43577-023-00581-w*

[31] *Ibid*

[32] *Peng, Y. Can U.S. Sanctions Truly Hinder the Rise of China's Semiconductor Industry? An Analysis from the Perspective of "Creative Insecurity". Chin. Polit. Sci. Rev. (2025). https://doi.org/10.1007/s41111-025-00282-6*

[33] *Ibid*

[34] *Sokler, B. D., Hecht, A., & Fjeld, C. T. (2025, August 29). Some congressional dissent to Trump administration's AI chip sales to China; FTC cracks down on AI marketing claims. AI: The Washington Report. https://natlawreview.com/article/some-congressional-dissent-trump-administrations-ai-chip-sales-china-ftc-cracks*

[35] *Bhat, S. M. (2025). A seminar report on GPUs in AI: NVIDIA's dominance and the rising competition. ResearchGate. https://doi.org/10.13140/RG.2.2.24679.76960*

[36] *Ibid*

[37] *Zurita, A. L. (2024, August 20). The EU AI Act: What are the obligations for providers? DataGuard. https://www.dataguard.com/blog/the-eu-ai-act-and-obligations-for-providers/*

*Corresponding Author: **Olubukola (Buki) Ogunsakin.**

directly, it, rather, creates a system that intensifies corporate responsibilities in these domains.[38]

Similar initiatives are the European Green Deal and energy-efficiency regulations; that is, businesses involved in AI must account for how sustainable their operations are.[39] For example, large-scale data centres operating in the European Union face mandatory report submission on how they handle the issue of energy and carbon emissions.[40] Therefore, AI use is mixed with the demands of environmental law views the perspective of the EU as one that believes in the innovations, but on the condition that it will maintain ecological standards.[41]

The challenge of this approach is manifold; however, two will be considered.

i. The EU is a lucrative market that has a backing for consumer trust.
ii. The weight of compliance might be too heavy for startups to bear.

The conclusion, therefore, is that just as the EU's legal framework presents an opportunity, it is still a barrier which companies must be careful about.

C. China: The Theme of Self-Reliance and Resource Nationalism.

Meanwhile, China has taken the chips war as a tussle for independence, and technological autonomy.[42] Independently driving semiconductors production for so long, with Beijing pushing for its domestic chip manufacturing through the investment and support of the state.[43] Companies committed to this vision are the likes of Semiconductor Manufacturing International Corporation (SMIC), notwithstanding that they may lag behind global leaders in producing the most advanced of chips.[44]

In a bid to fortify its position, China also deployed export restrictions on certain earth minerals which are considered to be rare.[45] These minerals are of utmost necessity to the production of chips and energy technologies.[46] As it weaponises its dominion over these materials, China signals a sense of capacity to play the game of resource leverage.[47]

Also important is the fact that the Chinese laws have framed semiconductors as a matter that demands national security.[48] For China, mastering semiconductor technology is not just an economic imperative, but also a matter of national security.[49] Chips in the People's Republic of China are not only industrial products; they are instruments used to measure military capacity, they determine economic independence and also gauge the resilience of political powers.[50] This, among other reasons, is why China is unlikely to compromise in negotiations that evolve in global trade. Therefore, for businesses in or within China, the risks are acute. There are concerns bordering on export bans, tariffs, or shifts in policies that are likely to upend corporate strategies in the twinkle of an eye.[51] Regardless, the sheer size of what China holds in the market makes disengagement impossible.

D. Other Emerging Jurisdictions

While much has been said about the dominant jurisdictions that control the headlines, other jurisdictions are worth considering. For example, Japan, the US, South Korea, and Taiwan (Chip 4 Alliance) are at the crossroads of chip manufacturing globally, as they balance their reliance on exports with the risks attached to either aligning with Washington or Beijing.[52] Taiwan particularly sits in a position where its dominance of semiconductors is worthy of economic pride, while it can also be a magnet that attracts pressures from world powers.[53] Its semiconductor manufacturing dominance has deepened in recent years,

[38] *Ibid*

[39] *Alzoubi, Y. I., & Mishra, A. (2024). Green artificial intelligence initiatives: Potentials and challenges. Journal of Cleaner Production, 468, 143090. https://doi.org/10.1016/j.jclepro.2024.143090*

[40] *Datacenters.com. (2025, July 8). Inside the EU's crackdown on data center emissions: What it means globally. https://www.datacenters.com/news/inside-the-eu-s-crackdown-on-data-center-emissions-what-it-means-globally*

[41] *Pagallo, U., Ciani Sciolla, J., & Durante, M. (2022). The environmental challenges of AI in EU law: Lessons learned from the Artificial Intelligence Act (AIA) with its drawbacks. Transforming Government: People, Process and Policy, 16(6), 359–376. https://doi.org/10.1108/TG-07-2021-0121*

[42] *Bradford, Anu, 'The Battle for Technological Supremacy: The US–China Tech War', Digital Empires: The Global Battle to Regulate Technology (New York, 2023; online edn, Oxford Academic, 21 Sept. 2023), https://doi.org/10.1093/oso/9780197649268.003.0006, accesse d 29 Aug. 2025.*

[43] *He, L. (2024, May 27). China is pumping another $47.5 billion into its chip industry. CNN. https://edition.cnn.com/2024/05/27/tech/china-semiconductor-investment-fund-intl-hnk*

[44] *Hamdani, M., Belfencha, I. Strategic implications of the US-China semiconductor rivalry. Discov glob soc **2**, 67 (2024). https://doi.org/10.1007/s44282-024-00081-5*

[45] *Jackson, L., Lv, A., Onstad, E., & Scheyder, E. (2025, April 4). China hits back at US tariffs with export controls on key rare earths. Reuters. https://www.reuters.com/world/china-hits-back-us-tariffs-with-rare-earth-export-controls-2025-04-04/*

[46] *Ibid*

[47] *Ibid*

[48] *Huang, Q., Wang, B., & Lin, J. (2024). The risk spillover between geopolitical risk and China's 5G, semiconductor and rare earth industries. Heliyon, 10(22), e40048. https://doi.org/10.1016/j.heliyon.2024.e40048*

[49] *Ibid*

[50] *Ibid*

[51] *Germann, J., et al. (2024). Ibid*

[52] *Liu, R. C., Tang, H., Kao, Y., & Chou, Y. (2025). From vulnerabilities to resilience: Taiwan's semiconductor industry and geopolitical challenges. Telecommunications Policy, 49(4), 102951. https://doi.org/10.1016/j.telpol.2025.102951*

[53] *Davidson, H., & Lin, C.-h. (2024, July 19). How Taiwan secured semiconductor supremacy – and why it won't give it up. The Guardian. https://www.theguardian.com/world/article/2024/jul/19/taiwan-semiconductor-industry-booming*

*Corresponding Author: **Olubukola (Buki) Ogunsakin.**

solidifying its status as the linchpin of global chip production.[54]

On the flip side, the global south is excluded from the race but not excused from the consequences.[55] As time goes on, many developing countries tend to face higher costs of AI technologies and energy shortages, which are exacerbated due to the proliferation of data centres.[56] Herein is the question of equity asked: why should the benefits of AI concentrate in advanced economies while its costs extend to vulnerable regions?

Unfortunately, as at the time of making this research, global institutions have yet to make an express framework for semiconductor governance, and since they are absent when needed, national laws have come to a partial rescue, albeit on diverging premises.[57] To this end, whether a framework emerges in the future or we remain in the currency of fragmented legislation, is a question that will determine the world of business in decades to come.

IV. CONTEMPORARY LEGAL RISKS AND BUSINESS ISSUES

The energy demand of AI and chip scarcity is no longer a matter that is far away into the future; it has become a legal and business vulnerability.[58] These risks are shown in certain ways explicated in this section.

A. Anti-Trust and Competition Risks

The high level of concentration within the semiconductor industry, as established in the foregoing analysis, is a cause for serious concern.[59] Nvidia's considerable share of the GPU market exemplifies a dominant market position, which prompts regulatory alarm over potential barriers to entry and highlights potential anti-competitive practices.[60] Antitrust enforcement actions are now capable of disrupting supply arrangements.[61] For instance, should regulators dismantle a dominant chip supplier, firms would face significant uncertainty regarding hardware access. Moreover, the mere prospect of such intervention can influence corporate decision-making.[62]

Consequently, antitrust enforcement remains a powerful tool capable of disrupting established supply arrangements. Where regulators do not intervene to dismantle a dominant supplier, the mere threat of such intervention can profoundly influence strategic decision-making across the global technology landscape, underscoring the fragile interdependence between market structure, regulation, and innovation.

B. ESG and Sustainability Risks

Another risk is the Environmental, Social, and Governance (ESG) obligations. As AI energy grows, firms engaging in this enterprise are being scrutinised for contributing to carbon emissions.[63] In modern corporate governance, the failure to integrate environmental management systems into reporting - corporate and governance frameworks, may constitute a breach of directors' fiduciary duties, as environmental risks are increasingly recognized as material financial risks.[64]

There is also the concern of reputation. Greenwashing, which is the act of exaggerating environmental credentials,[65] has become a hotbed of litigation as companies that parade themselves as compliant with energy demands without adducing evidence to such claims expose themselves to lawsuits.[66]

Meanwhile, the social aspect of ESG cannot be ignored. Even though it is claimed that AI systems rely on a large chunk of energy, they also require manual labour across chains.[67] These labourers are the miners who extract rare earths for chips, and the content moderators who engage in labelling data.[68,69]

[54] *Shattuck, T. J. (2020). Stuck in the middle: Taiwan's semiconductor industry, the U.S.-China tech fight, and cross-strait stability. Orbis, 65(1), 1–14. https://doi.org/10.1016/j.orbis.2020.11.005*

[55] *Asaloko, P. P., Asongu, S., & Zogo, T. E. (2025). Does peak technology combat energy poverty in developing countries? International Journal of Energy Sector Management. Advance online publication. https://doi.org/10.1108/IJESM-12-2024-0028*

[56] *Ibid*

[57] *Xiong, W., Wu, D., & Yeung, J. H. Y. (2024). Semiconductor supply chain resilience and disruption: Insights, mitigation, and future directions. International Journal of Production Research, 63(1), 1–24. https://doi.org/10.1080/00207543.2024.2387074*

[58] *de Vries, A. (2023). The growing energy footprint of artificial intelligence. Joule, 7(10), 2191–2194. https://doi.org/10.1016/j.joule.2023.09.004*

[59] *Chen, A., & Lo, R. H.-Y. (2016). Semiconductor packaging: Materials interaction and reliability. CRC Press. https://doi.org/10.1201/b11260*

[60] *Tan, T. (2025). Business analysis: A comparative analysis of AMD and NVIDIA. Advances in Economics Management and Political Sciences, 146(1), 51–60. https://doi.org/10.54254/2754-1169/2024.LD19058*

[61] *Spulber, D. F. (2023). Antitrust and innovation competition. Journal of Antitrust Enforcement, 11(1), 5–50. https://doi.org/10.1093/jaenfo/jnac013*

[62] *Ibid*

[63] *Tseng, C.-J., & Lin, S.-Y. (2024). Role of artificial intelligence in carbon cost reduction of firms. Journal of Cleaner Production, 447, 141413. https://doi.org/10.1016/j.jclepro.2024.141413*

[64] *Bamwa, B. P., Okoro, C. C., & Akinyomi, O. J. P. (2025). Effect of Corporate Governance Mechanisms on Environmental Reporting of Listed Oil and Gas Firms in Nigeria. 11. 263-279.*

[65] *Şenyapar, H. N. D. (2024). Unveiling greenwashing strategies: A comprehensive analysis of impacts on consumer trust and environmental sustainability. Journal of Energy Systems, 8(3), 164–181. https://doi.org/10.30521/jes.1436875*

[66] *Ibid*

[67] *Nweje, U. (2025). Leveraging artificial intelligence for predictive supply chain management: Focus on how AI-driven tools are revolutionizing demand forecasting and inventory optimization. International Journal of Science and Research Archive, 14(1). https://doi.org/10.30574/ijsra.2025.14.1.0027*

[68] *Levy, S., Rosen, C. M., & Iles, A. (2017). Mapping the Product Life Cycle: Rare Earth Elements in Electronics. Case Studies in the Environment. 1(1), 1–9.*

[69] *Yılmaz, Ö., & Bostancı, M. (2025). Labour And Exploitation Processes in Artificial Intelligence: Example of Digital Taylorism in Data Labelling. Toplum ve Kültür Araştırmaları Dergisi, (15), 24,25.*

*Corresponding Author: **Olubukola (Buki) Ogunsakin.**

Thus, when there is failure in labour standards culminating from these chains, reputational damage is unavoidable against the corporations that depend on them.

C. Export Controls and Sanctions Risks

As the preceding analysis demonstrates, the United States has imposed escalating restrictions on semiconductor exports to China.[70] These controls, which shift in response to geopolitical developments, represent one of the most volatile legal and business risks today. For multinational corporations, this volatility creates a compliance minefield: a situation in which a product legally sold one day may become subject to export prohibitions the next.[71]

Restrictions on exports also carry the risk of whiplash. Take, for example, the US bans the exportation of chips to China; Beijing, in turn, retaliates by withholding rare earth materials, thus affecting the production of chips globally. Firms at the receiving end now face the issue of either the inability to export and/or the inability to import the raw materials needed for production.

These risks point to a truth that the chips war and AI energy crisis are at the centre of law and business today. The challenge is to uniformly respond to these risks because they are interconnected. A firm caught in the trap of an export-control dispute may still face ESG lawsuits if its supply chains are exposed. In similar terms, a company navigating data privacy must also consider the energy implications of its systems as large data centres and AI systems have significant carbon footprints. Consequently, the days of isolated and pigeon-holed risk management is over.

V. LEGAL PATHWAYS FOR AI-DRIVEN ENTERPRISES

Now that the risks have been adumbrated, the question of how to respond is brought to the fore. That is, how do businesses respond to these questions? Below are, therefore, different pathways explored for AI-driven enterprises to explore to build resilience in a world that has been defined by energy scarcity and chip competition.

A. Supply Chain Diversification: From Fragility to Resilience

This is arguably the most obvious strategy, yet also the most difficult, to liberate the enterprise from over-dependence on just a single source of semiconductors. Presently, the existence of many businesses is hinged on their access to a few GPU manufacturers,[72] with Nvidia's monopoly cited as an example. Diversification is, therefore, to the rescue. Companies are obliged to cultivate an interjurisdictional sourcing. This can be in form of contractual commitments with suppliers or even joint ventures with producers. Diversification in this sense, is next to survival as it involves contractual innovations like using force majeure clauses and supply-disruption penalties.[73]

B. ESG-Aligned Compliance Frameworks: Turning Liability into Legitimacy

Another pathway to explore is the construction of frameworks that comply with ESG demands. Too often than not, companies take matters of ESG with levity, making it more of an afterthought and a glossy chapter in annual reports.[74] Whereas this approach may be dangerous, taking cognisance of the current era's stance on AI's energy hunger.[75] However, to stay ahead, enterprises cannot help but embed ESG into their governance DNA. This means establishing energy audits for data centres, publishing carbon account metrics, and integrating sustainability targets into decision-making.[76]

It must quickly be noted that ESG is not only environmental. The 'S- social dimension' matters just as much as the environmental approach.[77] It is expected of companies to show that their supply chains do not breach human rights, that mineral extraction does not exploit communities, and that labour conditions meet international best standards.[78] Ignoring these social but inevitable part of the ESG risks reputational scars in the long run. Lawsuits and shareholder activists might also be breached in the process.

C. Cross-Jurisdictional Regulatory Planning: Navigating the Patchwork

The above evinced regulatory regimes across various jurisdictions are what might be termed a cartography of

---

[70] *Freifeld, K. (2025, May 29). US curbs chip design software, chemicals, other shipments to China. Reuters. https://www.reuters.com/world/china/trump-tells-us-chip-designers-stop-selling-china-ft-reports-2025-05-28/*

[71] *Edgile. (2024, November 14). Potential compliance minefields hidden in the newly revised California Privacy Act. Edgile. https://edgile.com/blog/potential-compliance-minefields-hidden-in-the-newly-revised-california-privacy-act/*

[72] *Song, Y. (2024). NVIDIA's market strategy and innovation: The fusion of technological leadership and brand building. Advances in Economics Management and Political Sciences, 137(1), 143–150. https://doi.org/10.54254/2754-1169/2024.18671*

[73] *Burkhart, D., & Bode, C. (2025). Force majeure in business relationships. Journal of Business Research, 195, 115409. https://doi.org/10.1016/j.jbusres.2025.115409*

[74] *Tavares, R. (2025, March 13). Corporate responsibility makes financial sense. Here's why. World Economic Forum. https://www.weforum.org/stories/2025/03/why-esg-is-now-a-financial-imperative/*

[75] *O'Donnell, J., & Crownhart, C. (2025, May 20). We did the math on AI's energy footprint. Here's the story you haven't heard. MIT Technology Review. https://www.technologyreview.com/2025/05/20/1116327/ai-energy-usage-climate-footprint-big-tech/*

[76] *Daim, T., Justice, J., Krampits, M., Thirumalai, M., & [other authors]. (2009). Data center metrics: An energy efficiency model for information technology managers. Management of Environmental Quality: An International Journal, 20(6), 712–731. https://doi.org/10.1108/14777830910990870*

[77] *Agbakwuru, V., Onyenahazi, O. B., & Antwi, B. O. (2024). The impact of environmental, social, and governance (ESG) reporting on corporate financial performance. International Journal of Research Publication and Reviews, 5(9), 3629–3644. https://doi.org/10.55248/gengpi.5.0924.2710*

[78] *Ibid*

*Corresponding Author: **Olubukola (Buki) Ogunsakin.**

compliance.[79] For emerging enterprises, the danger is in the friction created when business spans across international borders.

Cross-jurisdictional planning is not without strategies which are to be harmonised. To this end, what companies are obligated to do is to map out the legal obligations that will span across geographies and satisfy international standards.[80] This approach, though resource-intensive, tends to protect firms from being blindsided by enforcement that can be sudden in a jurisdiction they once underestimated.

Here, Regulatory Technology (RegTech) tools are game-changers in the industry, and therefore, AI compliance software capable of monitoring regulations in real time will soon become indispensable.[81] However, technology alone is not enough. Firms must be charged to commit investment to legal foresight functions, which maybe in-house or external advisors who will not only be saddled with the responsibility to interpret the law but to anticipate where the law will potentially tilt.

D. Building Resilient Business Models: Legal Foresight as Strategy

For businesses, there is a need to see their models of value creation through the lens of resilience.[82] Legal strategy is expected not to be just an appendage to business planning, instead it is at the core of any sustainability infrastructure.[83] A notable dimension of resilience that is worth consideration is insurance and risk transfer.[84] Insurance, though costly, will distribute risk and provide financial breathing space for firms in times of need.[85] Another dimension that will be worthy of noting is scenario planning, and just as military strategists run war games, businesses should run regulatory games, aiming to be a simulation of what happens should the US tighten export controls, if China bans rare-earth exports, or the EU imposes stricter carbon levies.[86] Such foresight will transform laws from a reactive constraint into a proactive strategy.

When taken together, it is revealed that these recommendations have metamorphosed into survival maps. Eventually, champions of the emerging chips war will be the firms with the most adaptive legal strategies. Those who understand that the true terrain of competition has long moved from matters of innovation to governance.

VI. CONCLUSION

The story of AI can no longer be narrated as a tale of innovation; it is instead a saga braided with geopolitics. The chips war discussed in this research is about whose laws will govern tomorrow's intelligence, whose grids will power it, and whose businesses will withstand the tests of compliance. The lesson companies are to learn from this is that the act of treating the energy intensity of AI as a footnote, or to regard semiconductor supply chains as an afterthought, is to gamble with survival. They risk reputational bruises that no amount of branding can conceal.

Also, for legal practitioners, a rare opportunity has emerged, but only lawyers who understand this emerging phase and how to handle it will be able to stem the storm. On this note, it is concluded that the coming times will test the nations. But just as it is applicable in every crisis, there is always a policy window – a rare, temporary opportunity for decisive action. Political scientist John Kingdon described a concept called the "Multiple Streams Framework" which hypothecates that a political crisis creates this window by altering three streams – the problem, policy, and politics streams simultaneously.[87] The chance here is to enact regulations that will balance technological hunger with planetary limits.

However, one salient question arises for business owners and professionals: Will you wait to be caught in this wake or prepare to lead amidst turbulence?

REFERENCES

1. Xu, Y., et al. (2024). Artificial intelligence is restructuring a new world. *Innovation*, 5(6), 100725. https://doi.org/10.1016/j.xinn.2024.100725
2. Husein, M., Rajagukguk, J. R., & Putranto, K. (2024). The role of artificial intelligence in improving the efficiency of the company's supply chain. *International Journal of Engineering Science and Information Technology*, *4*(4), 156–172. https://doi.org/10.52088/ijesty.v4i4.596
3. Wang, Q., Li, Y., & Li, R. (2025). Integrating artificial intelligence in energy transition: A comprehensive review. *Energy Strategy Reviews*, *57*, 101600. https://doi.org/10.1016/j.esr.2024.101600

[79] *Tahiri, A., & El Arif, F. Z. (2024). Toward a mapping of compliance risk in banks. Journal of Financial Regulation and Compliance, 32(5), 633–645. https://doi.org/10.1108/JFRC-03-2024-0048*

[80] *Mane, V. (2025). Understanding the legal and regulatory requirements for corporate social responsibility (CSR) in different regions: A comparative analysis. International Journal for Multidisciplinary Research, 7(1), 1–20*

[81] *Adesokan, A. (2024). Artificial intelligence in enhancing regulatory compliance and risk management. https://doi.org/10.13140/RG.2.2.20915.44326*

[82] *Radić, M., Herrmann, P., Haberland, P., & Riese, C. R. (2022). Development of a business model resilience framework for managers and strategic decision-makers. Schmalenbach Journal of Business Research, 74(5), 1–27. https://doi.org/10.1007/s41471-022-00135-x*

[83] *Ibid*

[84] *Sheehan, B., Mullins, M., & Shannon, D. (2023). On the benefits of insurance and disaster risk management integration for improved climate-related natural catastrophe resilience. Environment Systems and Decisions, 43(4), 1–10. https://doi.org/10.1007/s10669-023-09929-8*

[85] *Kielholz, W. (2000). The cost of capital for insurance companies. Geneva Papers on Risk and Insurance – Issues and Practice, 25(1), 4–24. https://doi.org/10.1111/1468-0440.00044*

[86] *Perera, A. (2025, April 17). Why China curbing rare earth exports is a blow to the US. BBC News. https://www.bbc.com/news/articles/c1drqeev36qo*

[87] *Zahariadis, N. (2019). The multiple streams framework: Structure, limitations, prospects. In Theories of the policy process, second edition (pp. 65-92). Routledge.*

*Corresponding Author: **Olubukola (Buki) Ogunsakin.***

4. Salathé, M. (2023, November 15). *Does ChatGPT use 10x more energy than a standard Google search? A journey down the rabbit hole of viral AI energy claims.* Engineering Prompts. https://engineeringprompts.substack.com/p/does-chatgpt-use-10x-more-energy
5. Qian, Y., Alhaskawi, A., Dong, Y., Ni, J., Abdalbary, S., & Lu, H. (2024). Transforming medicine: Artificial intelligence integration in the peripheral nervous system. *Frontiers in Neurology, 15,* 1332048. https://doi.org/10.3389/fneur.2024.1332048
6. Judge, B., Nitzberg, M., & Russell, S. (2025). When code isn't law: Rethinking regulation for artificial intelligence. *Policy and Society, 44*(1), 85–97. https://doi.org/10.1093/polsoc/puae020
7. Krishnamohan, A. (2025, May 29). *Semiconductors & AI: 2024's industry transformation unveiled.* TechFunnel. https://www.techfunnel.com/fintech/ft-growth-hacks/semiconductors-ai-2024-transformation/
8. Greene-Dewasmes, G., & Tladi, T. (2025, January 21). *AI's energy dilemma: Challenges, opportunities, and a path forward.* World Economic Forum. https://www.weforum.org/stories/2025/01/ai-energy-dilemma-challenges-opportunities-and-path-forward/
9. Keenan, V. (2025, July 30). *The invisible force determining your AI future: Understanding data gravity.* Salesforce DevOps. https://salesforcedevops.net/index.php/2025/07/30/the-invisible-force-determining-your-ai-future-understanding-data-gravity/
10. Rokon, A. (2022). *Prospects of ML on electricity demand forecasting: Introducing AI to the national grid for the best predictive modelling* (Master's thesis, Applied Statistics and Data Science). ResearchGate. https://doi.org/10.13140/RG.2.2.29791.78247
11. International Energy Agency. (2025, April 10). *Energy and AI*. https://www.iea.org/reports/energy-and-ai
12. Alex de Vries. The growing energy footprint of artificial intelligence. Oct 2023. CellPress, Joule, Volume 7, Issue 10. https://doi.org/10.1016/j.joule.2023.09.004
13. Mavani, C., Mistry, H., Patel, R., & Goswami, A. (2024). Artificial intelligence (AI) based data center networking. *International Journal on Recent and Innovation Trends in Computing and Communication, 12*(2), 508–518.
14. Shumskaia, E. I. (2022). Artificial intelligence—Reducing the carbon footprint? In *Industry 4.0, fighting climate change in the economy of the future* (pp. 365–378). Springer. https://doi.org/10.1007/978-3-030-79496-5_33
15. Rasheed, M. Q., Yuhuan, Z., Nazir, M., Ahmed, Z., & Yu, X. (2025). How do semiconductors, artificial intelligence, geopolitical risk, and their moderating effects shape renewable energy production in leading semiconductor manufacturing countries? *Technology in Society, 80,* 102761. https://doi.org/10.1016/j.techsoc.2024.102761
16. Mo, L., & Potkin, F. (2025, August 19). *Exclusive: Nvidia working on new AI chip for China that outperforms the H20, sources say.* Reuters. https://www.reuters.com/world/china/nvidia-working-new-ai-chip-china-that-outperforms-h20-sources-say-2025-08-19/
17. Ochonogor, K. N., Osho, G. S., Anoka, C. O., & Ojumu, O. G. (2023). *The COVID-19 pandemic and supply chain disruption: An analysis of the semiconductor industry's resilience.* ResearchGate. https://www.researchgate.net/publication/368190282_The_COVID-19_Pandemic_and_Supply_Chain_Disruption_An_Analysis_of_the_Semiconductor_Industry's_Resilience
18. Flamm, K., & Bonvillian, W. B. (2025, February 20). *How Intel's innovation problem became a national security crisis*. *American Affairs Journal, 9*(1). https://americanaffairsjournal.org/2025/02/how-intels-innovation-problem-became-a-national-security-crisis/
19. Krzywdzinski, M. (2017). Automation, skill requirements and labour-use strategies: High-wage and low-wage approaches to high-tech manufacturing in the automotive industry. *New Technology, Work and Employment, 32*(3), 247–267. https://doi.org/10.1111/ntwe.12100
20. Zhao, Y. (2025). What has the chip war brought to China's chip market? *International Journal of Social Sciences and Public Administration*, *6*(2), 169–192. https://doi.org/10.62051/ijsspa.v6n2.2
21. de Vries-Gao, A. (2025). Artificial intelligence: Supply chain constraints and energy implications. *Joule*, *9*(6), 101961. https://doi.org/10.1016/j.joule.2025.101961
22. Germann, J., Rolf, S., Baines, J., & Starrs, S. K. (2024). A chip war made in Germany? US techno-dependencies, China chokepoints, and the German semiconductor industry. *Politics and Governance*, *12*, 1–20. https://doi.org/10.17645/pag.8265
23. Taylor, M. (2023). The US CHIPS and Science Act of 2022. *MRS Bulletin*, *48*(9), 678–686. https://doi.org/10.1557/s43577-023-00581-w
24. Peng, Y. Can U.S. Sanctions Truly Hinder the Rise of China's Semiconductor Industry? An Analysis from the Perspective of "Creative Insecurity". *Chin. Polit. Sci. Rev.* (2025). https://doi.org/10.1007/s41111-025-00282-6
25. Sokler, B. D., Hecht, A., & Fjeld, C. T. (2025, August 29). *Some congressional dissent to Trump*

*Corresponding Author: **Olubukola (Buki) Ogunsakin.**

administration's AI chip sales to China; FTC cracks down on AI marketing claims. AI: The Washington Report. https://natlawreview.com/article/some-congressional-dissent-trump-administrations-ai-chip-sales-china-ftc-cracks

26. Bhat, S. M. (2025). *A seminar report on GPUs in AI: NVIDIA's dominance and the rising competition.* ResearchGate. https://doi.org/10.13140/RG.2.2.24679.76960
27. Zurita, A. L. (2024, August 20). *The EU AI Act: What are the obligations for providers?* DataGuard. https://www.dataguard.com/blog/the-eu-ai-act-and-obligations-for-providers/
28. Alzoubi, Y. I., & Mishra, A. (2024). Green artificial intelligence initiatives: Potentials and challenges. *Journal of Cleaner Production, 468*, 143090. https://doi.org/10.1016/j.jclepro.2024.143090
29. Datacenters.com. (2025, July 8). *Inside the EU's crackdown on data center emissions: What it means globally*. https://www.datacenters.com/news/inside-the-eu-s-crackdown-on-data-center-emissions-what-it-means-globally
30. Pagallo, U., Ciani Sciolla, J., & Durante, M. (2022). The environmental challenges of AI in EU law: Lessons learned from the Artificial Intelligence Act (AIA) with its drawbacks. *Transforming Government: People, Process and Policy, 16*(6), 359–376. https://doi.org/10.1108/TG-07-2021-0121
31. Bradford, Anu, 'The Battle for Technological Supremacy: The US–China Tech War', *Digital Empires: The Global Battle to Regulate Technology* (New York, 2023; online edn, Oxford Academic, 21 Sept. 2023), https://doi.org/10.1093/oso/9780197649268.003.0006, accessed 29 Aug. 2025.
32. He, L. (2024, May 27). *China is pumping another $47.5 billion into its chip industry*. CNN. https://edition.cnn.com/2024/05/27/tech/china-semiconductor-investment-fund-intl-hnk
33. Hamdani, M., Belfencha, I. Strategic implications of the US-China semiconductor rivalry. *Discov glob soc* **2**, 67 (2024). https://doi.org/10.1007/s44282-024-00081-5
34. Jackson, L., Lv, A., Onstad, E., & Scheyder, E. (2025, April 4). *China hits back at US tariffs with export controls on key rare earths*. Reuters. https://www.reuters.com/world/china-hits-back-us-tariffs-with-rare-earth-export-controls-2025-04-04/
35. Huang, Q., Wang, B., & Lin, J. (2024). The risk spillover between geopolitical risk and China's 5G, semiconductor and rare earth industries. *Heliyon, 10*(22), e40048. https://doi.org/10.1016/j.heliyon.2024.e40048
36. Liu, R. C., Tang, H., Kao, Y., & Chou, Y. (2025). From vulnerabilities to resilience: Taiwan's semiconductor industry and geopolitical challenges. *Telecommunications Policy, 49*(4), 102951. https://doi.org/10.1016/j.telpol.2025.102951
37. Davidson, H., & Lin, C.-h. (2024, July 19). How Taiwan secured semiconductor supremacy – and why it won't give it up. *The Guardian*. https://www.theguardian.com/world/article/2024/jul/19/taiwan-semiconductor-industry-booming
38. Shattuck, T. J. (2020). Stuck in the middle: Taiwan's semiconductor industry, the U.S.-China tech fight, and cross-strait stability. *Orbis, 65*(1), 1–14. https://doi.org/10.1016/j.orbis.2020.11.005
39. Asaloko, P. P., Asongu, S., & Zogo, T. E. (2025). Does peak technology combat energy poverty in developing countries? *International Journal of Energy Sector Management*. Advance online publication. https://doi.org/10.1108/IJESM-12-2024-0028
40. Xiong, W., Wu, D., & Yeung, J. H. Y. (2024). Semiconductor supply chain resilience and disruption: Insights, mitigation, and future directions. *International Journal of Production Research, 63*(1), 1–24. https://doi.org/10.1080/00207543.2024.2387074
41. de Vries, A. (2023). The growing energy footprint of artificial intelligence. *Joule, 7*(10), 2191–2194. https://doi.org/10.1016/j.joule.2023.09.004
42. Chen, A., & Lo, R. H.-Y. (2016). *Semiconductor packaging: Materials interaction and reliability*. CRC Press. https://doi.org/10.1201/b11260
43. Tan, T. (2025). Business analysis: A comparative analysis of AMD and NVIDIA. *Advances in Economics Management and Political Sciences, 146*(1), 51–60. https://doi.org/10.54254/2754-1169/2024.LD19058
44. Spulber, D. F. (2023). Antitrust and innovation competition. *Journal of Antitrust Enforcement, 11*(1), 5–50. https://doi.org/10.1093/jaenfo/jnac013
45. Tseng, C.-J., & Lin, S.-Y. (2024). Role of artificial intelligence in carbon cost reduction of firms. *Journal of Cleaner Production, 447*, 141413. https://doi.org/10.1016/j.jclepro.2024.141413
46. Bamwa, B. P., Okoro, C. C., & Akinyomi, O. J. P. (2025). Effect of Corporate Governance Mechanisms on Environmental Reporting of Listed Oil and Gas Firms in Nigeria. 11. 263-279.
47. Şenyapar, H. N. D. (2024). Unveiling greenwashing strategies: A comprehensive analysis of impacts on consumer trust and environmental sustainability. *Journal of Energy Systems, 8*(3), 164–181. https://doi.org/10.30521/jes.1436875
48. Nweje, U. (2025). Leveraging artificial intelligence for predictive supply chain management: Focus on how AI-driven tools are revolutionizing demand forecasting and inventory optimization. *International Journal of Science and Research Archive, 14*(1). https://doi.org/10.30574/ijsra.2025.14.1.0027
49. Levy, S., Rosen, C. M., & Iles, A. (2017). Mapping the Product Life Cycle: Rare Earth Elements in

*Corresponding Author: **Olubukola (Buki) Ogunsakin.**

Electronics. Case Studies in the Environment. 1(1), 1–9.

50. Yılmaz, Ö., & Bostancı, M. (2025). Labour And Exploitation Processes in Artificial Intelligence: Example of Digital Taylorism in Data Labelling. Toplum ve Kültür Araştırmaları Dergisi, (15), 24,25.
51. Freifeld, K. (2025, May 29). US curbs chip design software, chemicals, other shipments to China. *Reuters.* https://www.reuters.com/world/china/trump-tells-us-chip-designers-stop-selling-china-ft-reports-2025-05-28/
52. Edgile. (2024, November 14). Potential compliance minefields hidden in the newly revised California Privacy Act. Edgile. https://edgile.com/blog/potential-compliance-minefields-hidden-in-the-newly-revised-california-privacy-act/
53. Song, Y. (2024). NVIDIA's market strategy and innovation: The fusion of technological leadership and brand building. *Advances in Economics Management and Political Sciences*, *137*(1), 143–150. https://doi.org/10.54254/2754-1169/2024.18671
54. Burkhart, D., & Bode, C. (2025). Force majeure in business relationships. *Journal of Business Research*, *195*, 115409. https://doi.org/10.1016/j.jbusres.2025.115409
55. Tavares, R. (2025, March 13). Corporate responsibility makes financial sense. Here's why. *World Economic Forum.* https://www.weforum.org/stories/2025/03/why-esg-is-now-a-financial-imperative/
56. O'Donnell, J., & Crownhart, C. (2025, May 20). We did the math on AI's energy footprint. Here's the story you haven't heard. *MIT Technology Review*. https://www.technologyreview.com/2025/05/20/1116327/ai-energy-usage-climate-footprint-big-tech/
57. Daim, T., Justice, J., Krampits, M., Thirumalai, M., & [other authors]. (2009). Data center metrics: An energy efficiency model for information technology managers. *Management of Environmental Quality: An International Journal*, *20*(6), 712–731. https://doi.org/10.1108/14777830910990870
58. Agbakwuru, V., Onyenahazi, O. B., & Antwi, B. O. (2024). The impact of environmental, social, and governance (ESG) reporting on corporate financial performance. *International Journal of Research Publication and Reviews*, *5*(9), 3629–3644. https://doi.org/10.55248/gengpi.5.0924.2710
59. Tahiri, A., & El Arif, F. Z. (2024). Toward a mapping of compliance risk in banks. *Journal of Financial Regulation and Compliance*, *32*(5), 633–645. https://doi.org/10.1108/JFRC-03-2024-0048
60. Mane, V. (2025). Understanding the legal and regulatory requirements for corporate social responsibility (CSR) in different regions: A comparative analysis. *International Journal for Multidisciplinary Research*, *7*(1), 1–20
61. Adesokan, A. (2024). Artificial intelligence in enhancing regulatory compliance and risk management. https://doi.org/10.13140/RG.2.2.20915.44326
62. Radić, M., Herrmann, P., Haberland, P., & Riese, C. R. (2022). Development of a business model resilience framework for managers and strategic decision-makers. *Schmalenbach Journal of Business Research*, *74*(5), 1–27. https://doi.org/10.1007/s41471-022-00135-x
63. Sheehan, B., Mullins, M., & Shannon, D. (2023). On the benefits of insurance and disaster risk management integration for improved climate-related natural catastrophe resilience. *Environment Systems and Decisions*, *43*(4), 1–10. https://doi.org/10.1007/s10669-023-09929-8
64. Kielholz, W. (2000). The cost of capital for insurance companies. *Geneva Papers on Risk and Insurance – Issues and Practice*, *25*(1), 4–24. https://doi.org/10.1111/1468-0440.00044
65. Perera, A. (2025, April 17). Why China curbing rare earth exports is a blow to the US. *BBC News.* https://www.bbc.com/news/articles/c1drqeev36qo
66. Zahariadis, N. (2019). The multiple streams framework: Structure, limitations, prospects. In Theories of the policy process, second edition (pp. 65-92). Routledge.

*Corresponding Author: **Olubukola (Buki) Ogunsakin.**