

**CYBER SILENT SPRING:
LEVERAGING ESG+T FRAMEWORKS AND
TRUSTMARKS TO BETTER INFORM INVESTORS
AND CONSUMERS ABOUT THE SUSTAINABILITY,
CYBERSECURITY, AND PRIVACY OF INTERNET-
CONNECTED DEVICES**

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INTRODUCTION 507

I.LESSONS FROM THE BIRTH OF THE ENVIRONMENTAL MOVEMENT
..... 510

 A. Regulating Environmental Protection 510

 B. Corporate Social Responsibility to Protect the Environment
 515

 C. Understanding ESG+T..... 518

II.INTERNET OF THINGS PRIVACY AND SECURITY CHALLENGES 523

III.CRITIQUING ESG FRAMEWORKS AND INITIATIVES: INFORMING
INVESTORS AND CONSUMERS..... 525

 A. Problems with ESG 525

 B. Informing Investors 527

 1. SEC’s Role in Regulating ESG+T 527

 2. State Response..... 531

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The views and opinions expressed herein are those of the authors.

3. Private Response	533
4. Proposed Rules and Legislation	536
C. Informing Consumers	539
1. Label Design: Marketing and Consumer Psychology	539
2. Environmental Trustmarks	543
a. Private-Sector Frameworks	543
b. State-Levels Laws	543
c. Federal Regulations	544
3. Technology Trustmarks	545
a. Private-Sector Frameworks	545
b. Cyberspace Solarium Commission	546
c. Executive Orders	547
IV. COMPARATIVE CASE STUDIES	548
A. United Kingdom	549
B. European Union	550
C. Singapore	552
D. Summary	554
V. POLICY IMPLICATIONS	554
CONCLUSION	556

The rapid expansion of Internet of Things (IoT) devices and services is continuing and even being catalyzed by the COVID-19 pandemic with the number of Internet-connected devices already far exceeding the number of people on the planet, leading to widespread implications for natural and digital ecosystems. There is a growing cadre of Environmental, Social, Governance, and Technology (ESG+T) frameworks and initiatives to measure these impacts, which are being rolled out to better inform both investors and consumers about the impacts of firms' operations made all the more timely given both supply chain bottlenecks and pressing climate change goals. One such tool that is receiving increased attention is trustmarks, particularly labels. Efforts are already underway in Europe to incorporate privacy and cybersecurity information into existing CE labels, which are required for products with EU specifications.¹ To date, though, there has been no attempt in the legal literature, that we could identify, to account for global developments in such trustmarks that are seeking to communicate meaningful information about the cybersecurity and privacy

1. *CE Marking*, YOUR EUROPE https://europa.eu/youreurope/business/product-requirements/labels-markings/ce-marking/index_en.htm [<https://perma.cc/WAQ7-RJM6>] (last modified Nov. 21, 2022).

characteristics of Internet-connected devices and services to consumers. There are likewise divergent efforts underway to promote information transparency for investors. As regulators and civil society groups in Asia, and increasingly in the United States, are actively questioning the utility of how such trustmarks could function, and how to promote transparency more broadly in this space for investors and consumers alike, the time is ripe to conduct a survey of attempts to date, and identify where they have fallen short. As new trustmarks are fashioned, what lessons should be taken from the sustainable development movement and environmental reporting standards, along with best practices from cognitive science, marketing, and human decision-making?

INTRODUCTION

The environmental cost of our knowledge-driven economy is relatively well documented, and increasingly intertwined with pressing cybersecurity and privacy concerns. Consider the fact that Bitcoin mining alone now constitutes 110 terawatt hours annually, which is roughly 0.55% of global electricity production.² The demand for Bitcoin and other cryptocurrencies is being driven in part by cybercriminals, who rely on the distributed architecture of the blockchain technology underpinning these virtual assets to help anonymize their activities.³ This, in turn, has helped to fuel the epidemic of ransomware attacks hitting hospitals, schools, and other critical infrastructure providers across the United States and, indeed, around the world, leading to crackdowns, including in the United States and China, the latter of which banned cryptocurrency transactions in September of 2021.⁴

2. See Nic Carter, *How Much Energy Does Bitcoin Actually Consume?*, HARV. BUS. REV. (May 5, 2021), <https://hbr.org/2021/05/how-much-energy-does-bitcoin-actually-consume> [<https://perma.cc/GKG9-VHUK>]. The movement toward “proof of stake” and away from “proof of work” may help to address these environmental concerns, while raising new governance challenges. See Romain Dillet, *Ethereum Switches to Proof-of-Stake Consensus after Completing The Merge*, TECHCRUNCH (Sept. 15, 2022), <https://techcrunch.com/2022/09/15/ethereum-switches-to-proof-of-stake-consensus-after-completing-the-merge/> [<https://perma.cc/AN8X-FKRB>].

3. See Patrick Garrity, *How Cryptocurrency Fuels Ransomware*, RSA CONFERENCE (May 5, 2021), <https://www.rsaconference.com/library/blog/how-cryptocurrency-fuels-ransomware> [<https://perma.cc/VLS8-WNNK>].

4. See Julian Dossett, *China’s Cryptocurrency Ban: What it Means for Bitcoin, Coinbase and the US*, CNET (Sept. 28, 2021, 12:14 PM), <https://www.cnet.com/personal-finance/chinas-cryptocurrency-ban-what-it-means-for-bitcoin-coinbase-and-the-us/> [<https://perma.cc/2T2M-4RYP>].

A central facet of the digital revolution, also known as the “Fourth Industrial Revolution,”⁵ is that it is occurring alongside a global push toward sustainability to address the dire impacts of climate change, which the United Nations has called “the defining crisis of our time.”⁶ Yet the new wave of industries that are increasingly being sought, and supported, by governments around the world to fuel the green revolution, including by the United States—such as artificial intelligence, machine learning, quantum computing, and blockchain—are energy intensive. Thus, while the likes of AI can help address climate change by developing new models to detect and track carbon emissions, it can also contribute to the very collective action problem that it is trying to solve.⁷

There is a growing corpus of work exploring the intersection of climate change, cybersecurity, and sustainability, including the rush for rare Earth minerals that are essential to battery technologies.⁸ Less attention has been paid to sustainability in the Internet of Things (IoT) context, which is exploding with the number of Internet-connected devices already far exceeding the number of people on the planet with McKinsey projecting forty-three billion IoT devices by 2023,⁹ causing widespread implications along with positive and negative externalities for both natural and digital ecosystems.¹⁰ Yet we have Environmental, Social, Governance and

5. KLAUS SCHWAB, *THE FOURTH INDUSTRIAL REVOLUTION 2* (2017).

6. *The Climate Crisis – A Race We Can Win*, UNITED NATIONS, <https://www.un.org/en/un75/climate-crisis-race-we-can-win> [<https://perma.cc/3KSK-H58B>] (last visited Jan. 5, 2021).

7. See Payal Dhar, *The Carbon Impact of Artificial Intelligence*, 2 NATURE MACH. INTEL. 423, 423 (2020), <https://doi.org/10.1038/s42256-020-0219-9> (“[T]he carbon footprint of training a single big language model is equal to around 300,000 kg of carbon dioxide emissions. This is of the order of 125 round-trip flights between New York and Beijing, a quantification that laypersons can visualize.”).

8. See, e.g., MEGAN STIFLE, PUB. KNOWLEDGE, *SECURING THE MODERN ECONOMY: TRANSFORMING CYBERSECURITY THROUGH SUSTAINABILITY 1* (2018), https://publicknowledge.org/wp-content/uploads/2021/11/Securing_the_Modern_Economy-Transforming_Cybersecurity_Through_Sustainability_FINAL_4.18.18_PK.pdf [<https://perma.cc/CN99-JHDC>]; Scott J. Shackelford, *On Climate Change and Cyber Attacks: Leveraging Polycentric Governance to Mitigate Global Collective Action Problems*, 18 VAND. J. ENT. & TECH. L. 653 (2016); Scott J. Shackelford et al., *Sustainable Cybersecurity: Applying Lessons from the Green Movement to Managing Cyber Attacks*, 2016 U. ILL. L. REV. (1995); *FAQ: Do We Have Enough Rare Earth Metals for EVs?*, BETTERNZTRUST, <https://www.leadingthecharge.org.nz/about-us/faq/#id25> [<https://perma.cc/8T3T-DT9C>] (last visited Jan. 9, 2023).

9. Fredrik Dahlqvist et al., *Growing Opportunities in the Internet of Things*, MCKINSEY & CO. (July 22, 2019), <https://www.mckinsey.com/industries/private-equity-and-principal-investors/our-insights/growing-opportunities-in-the-internet-of-things> [<https://perma.cc/UP3K-NFX9>].

10. See *IoT and Sustainability: What Is the Environmental Impact?*, REC. EVOLUTION (June 22, 2020), <https://www.record-evolution.de/en/iot-and-sustainability-the-environment>

Technology (ESG+T) frameworks and tools at our disposal that have emerged thanks to the early environmental and later sustainability movements to help inform both investors and consumers about the impacts of these products, including through ESG reporting and trustmarks.

Efforts are already underway in Europe and Singapore to incorporate cybersecurity and data privacy information into existing CE trustmarks and labels, for example.¹¹ The Biden Administration also announced a pilot project in 2022 that would roll out the first U.S. IoT device labels in 2023.¹² To date, though, there has been no attempt in the legal literature that we could identify to account for global developments in digital trustmarks seeking to communicate meaningful information about the cybersecurity and privacy characteristics of Internet-connected devices and services to consumers, while promoting information transparency to investors is likewise immature. As regulators and civil society groups in Asia, and increasingly in the United States, are actively questioning the utility of how such trustmarks could function, the time is ripe to conduct a survey of attempts to date, and identify where they have fallen short. As new trustmarks are fashioned, what lessons should be taken from the sustainable development movement and environmental reporting standards, along with best practices from cognitive science, marketing, and human decision-making? More broadly, how can we promote transparency and better inform both investors and consumers about both the environmental and data governance practices of firms? Reporting and disclosure regimes have been shown to be integral to effective information sharing, which in turn is central to promoting communication, coordination, and ultimately trust in polycentric systems such as IoT.¹³

This Article is structured as follows. Part I briefly surveys key lessons from the evolution of the modern environmental movement to situate the

tal-impact-of-the-internet-of-things/ [https://perma.cc/EYX3-ZDCF] (describing the environmental and digital impacts of IoT devices).

11. See, e.g., *The EU Cybersecurity Certification Framework*, EUR. COMM'N, <https://digital-strategy.ec.europa.eu/en/policies/cybersecurity-certification-framework> [https://perma.cc/XF4S-VTGH] (last visited Jan. 5, 2021); *Cybersecurity Labelling Scheme*, CYBER SEC. AGENCY OF SING., <https://www.csa.gov.sg/Programmes/certification-and-labelling-schemes/cybersecurity-labelling-scheme/about-cls> [https://perma.cc/S564-ANBX] (Dec. 2, 2022).

12. See *Statement by NSC Spokesperson Adrienne Watson on the Biden-Harris Administration's Effort to Secure Household Internet-Enabled Devices*, THE WHITE HOUSE (Oct. 20, 2022), <https://www.whitehouse.gov/briefing-room/statements-releases/2022/10/20/statement-by-nsc-spokesperson-adrienne-watson-on-the-biden-harris-administrations-effort-to-secure-household-internet-enabled-devices/> [https://perma.cc/NXM8-DYR9].

13. See, e.g., Scott J. Shackelford & Scott O. Bradner, *Have You Updated Your Toaster? Transatlantic Approaches to Governing the Internet of Everything*, 72 HASTINGS L.J. 627, 629 (2021) (discussing IoT governance approaches and challenges in the United States and Europe).

discussion and better understand how grassroots movements translated into private and public sector actions, from Earth Day to the passage of the National Environmental Policy Act, that gave rise to environmental impact studies (EISs). Part II analyzes cybersecurity and privacy challenges in the IoT context. Part III critiques ESG frameworks and tools; those facing both investors, and consumers. It does this by first surveying federal, state, and private efforts at informing investors about ESG+T data, including key security, privacy, and governance challenges within the IoT context, and how leaders have thus far tried—and often failed—to better understand the many impacts of their decisions using ESG+T as a lens. It then summarizes the use of trustmarks in the environmental and tech contexts to better inform consumers about the ESG+T footprints of IoT devices. Part IV features a comparative case study examining how the United States, European Union, and various Asian nations are experimenting with ESG reporting and trustmarks to better inform investors and the public. Finally, Part V offers key findings and policy recommendations for policymakers and practitioners who are interested in designing both consumer-facing trustmarks, and Digital Impact Statements (DISs). We conclude with a survey of further research that needs to be done to fully realize this burgeoning field.

I. LESSONS FROM THE BIRTH OF THE ENVIRONMENTAL MOVEMENT

This Part surveys the history of the environmental movement before moving on to discuss how it was operationalized into the ESG paradigm, and more recently, expanded to include technology under ESG+T.

A. Regulating Environmental Protection

Environmental law in the United States has an exceedingly long and checkered history. Towns, cities, and states struggled with the regulation of environmental issues for centuries in this country. The regulation of our air, water, and land has been a constant and elusive problem dating back to the colonial era.¹⁴ U.S. environmental law can be seen as existing in two basic states: long periods of incremental changes, and short periods of rapid evolution in an effort to avoid or respond to environmental disasters.¹⁵ There

14. See generally STROTHER E. ROBERTS, *COLONIAL ECOLOGY, ATLANTIC ECONOMY: TRANSFORMING NATURE IN EARLY NEW ENGLAND* (2019).

15. Richard J. Lazarus & Sara Zdeb, *Environmental Law & Politics*, 8 *INSIGHTS L. & SOC'Y*, Spring 2008, at 10, *reprinted in* AM. BAR ASS'N (Jan. 5, 2021), https://www.americanbar.org/groups/public_education/publications/insights-on-law-and-society/volume-19/insigh

are several examples of attempts at regulation and environmental disasters that resulted from a lack of sufficient regulation.¹⁶ In 1881, two of the first laws setting air emission standards were created in Chicago and Cincinnati.¹⁷ Thirty years later (with a rapid increase in industrialization), most of the large U.S. cities had some form of regulatory control over air pollution to attempt to counter-act ever-increasing air contamination.¹⁸

Throughout the first 100 years of U.S. history, water pollution has been primarily regulated by states and local governments.¹⁹ By 1893, most federal courts believed that the federal government should manage interstate waterways to safeguard national waters.²⁰ Most federal water regulations prevented dumping that blocked or impeded water flow and/or water transportation.²¹ The federal government muddled through the environmental quagmire for another sixty years before engaging in serious environmental regulation and enforcement.²²

The refusal to promulgate comprehensive federal environmental legislation, coupled with a population explosion and largely unregulated industrialization, resulted in numerous historic environmental catastrophes. More serious disasters led to public outcries and federal regulatory response. For example, in Donora, Pennsylvania, a smog inversion in 1948 resulted in almost seven thousand illnesses and twenty deaths.²³ As a result of the rising concern about air pollution,²⁴ the Department of Health Education and

ts-vol--19---issue-1/environmental-law---politics/ [https://perma.cc/JJJ8-PLXF]; see also Richard J. Lazarus, *The Greening of America and the Graying of United States Environmental Law: Reflections on Environmental Law's First Three Decades in the United States*, 20 VA. ENV'T L.J. 75, 77–79 (2001).

16. See generally DAVID P. CURRIE, AIR POLLUTION: FEDERAL LAW AND ANALYSIS (1981) (providing a detailed discussion of the history of the Clean Air Act).

17. See FRANK P. GRAD, TREATISE ON ENVIRONMENTAL LAW § 2.01 (2021). These early laws were passed to control smoke emissions from local industries.

18. See Arnold W. Rietze, Jr., *A Century of Air Pollution Control Law: What's Worked; What's Failed; What Might Work*, 21 ENV'T L. 1549, 1576, 1585 (1991).

19. See Paul Boudreaux, *A New Clean Water Act*, 37 ENV'T L. REP. 10171, 10172 (2007).

20. See *The Daniel Ball*, 77 U.S. 557, 563–64 (1870) (stating that rivers must be regarded as public navigable rivers, which “constitute navigable waters of the United States”).

21. See Rivers and Harbors Appropriation Act of 1899, 33 U.S.C. § 403 (2012); Federal Water Pollution Control Act of 1948, Pub. L. No. 80-845, 62 Stat. 1155 (1948) (amended 1972); Clean Water Act of 1977, 33 U.S.C. §§ 1251 et seq. (2018).

22. See Richard J. Lazarus, *The Greening of America and the Graying of United States Environmental Law: Reflections on Environmental Law's First Three Decades in the United States*, 20 VA. ENV'T L.J. 75, 79 (2001); see also EPA History: *The Origins of EPA*, U.S. ENV'T PROTECTION AGENCY, <https://www.epa.gov/history/origins-epa> [https://perma.cc/95AD-5JFX] (Jan. 10, 2023).

23. See GRAD, *supra* note 17.

24. *The Great Smog of 1952*, MET OFF., <https://www.metoffice.gov.uk/weather/learn->

Welfare formed a new administrative agency, the National Pollution Control Administration of 1955.²⁵ However, this did little to stem overall toxic releases into the air.

As early as 1824, the U.S. Supreme Court recognized the federal government's right to regulate the use of its navigable waters.²⁶ Part of the Rivers and Harbors Act of 1899 prohibited the dumping of refuse into navigable waters and adjacent banks (if the refuse could wash into a navigable water).²⁷ After World War II, the rapid increase in industrialization and the population explosion resulted in more industrial waste and sewage being dumped into U.S. rivers and streams.²⁸ Therefore, in 1948, Congress passed the Federal Water Pollution Control Act.²⁹ However, the statute was anemic at best; it lacked any serious enforcement mechanism and relegated the United States to an advisory status.³⁰ The United States collected data and gave advice to the states, and, like the early air regulations, the primary enforcement role was left to the cities, towns, and states,³¹ similar to what has recently played out in some aspects of cybersecurity as discussed in Part IV of this Article.

These examples typified the early American ideas toward environmental enforcement, in that, to the extent that there was any environmental enforcement, it was done by local or state regulators. In fact, it would be proper to say that, in many cases, the industry was allowed to

about/weather/case-studies/great-smog [<https://perma.cc/WJU7-4DRH>] (last visited Jan. 20, 2022) (describing London Fog in 1952, which killed more than 4,000 people); *see also* Scott Harrison, *California Retrospective: 'Smog Sieges' Often Accompanied September Heat from the 1950s to '80s*, L.A. TIMES (Sept. 9, 2015, 8:33 PM), <https://www.latimes.com/local/california/la-me-heat-smog-20150910-story.html> [<https://perma.cc/Q3TD-FRSP>].

25. CLAYTON D. FORSWALL & KATHRYN E. HIGGINS, CLEAN AIR ACT IMPLEMENTATION IN HOUSTON: AN HISTORICAL PERSPECTIVE 1970-2005 4 (2005) <http://www.ruf.rice.edu/~eesi/scs/SIP.pdf> [<https://perma.cc/YQ2E-C8JG>].

26. *See* Gibbons v. Ogden, 22 U.S. 1, 197 (1824).

27. Rivers and Harbors Appropriation Act of 1899, 33 U.S.C. § 407 (2012).

28. *See* William L. Andreen, *The Evolution of Water Pollution Control in the United States—State, Local, and Federal Efforts, 1789-1972: Part II*, 22 STAN. ENV'T L.J. 215, 291 (2003).

29. *Summary of the Clean Water Act*, U.S. ENV'T PROTECTION AGENCY, <https://www.epa.gov/laws-regulations/summary-clean-water-act> [<https://perma.cc/AK8N-B2DD>] (July 6, 2022).

30. *See* Federal Water Pollution Control Act of 1948, Pub. L. No. 80-845, 62 Stat. 1155 (1948) (describing the policy of Congress to recognize, preserve, and protect the primary responsibilities of the States in controlling water pollution).

31. *Id.* *See generally* Frank J. Barry, *The Evolution of the Enforcement Provisions of the Federal Water Pollution Control Act: A Study of the Difficulty in Developing Effective Legislation*, 68 MICH. L. REV. 1103 (1970) (discussing the history of water pollution control laws in the United States).

self-regulate. This laissez-faire attitude toward environmental enforcement led to several pivotal events that changed U.S. environmental regulatory policy. In 1962, Rachel Carson's best seller, *Silent Spring*, raised the public's concerns about the unregulated use of pesticides and their deleterious effect upon ecology.³² Many say that it was the catalyst that began the modern environmental movement.³³

During the 1960s, industrial waste, public dumping, agricultural runoff, pesticides, and herbicides led the press to declare that "Lake Erie is dead."³⁴ The Secretary General of the United Nations, U Thant, told a global audience in May 1969 that it only had ten years to avert environmental disaster.³⁵ In June, he placed the blame for the pending disaster upon the United States.³⁶ The crisis was highlighted in June of 1969 when the Cuyahoga River ignited due to decades of pollution.³⁷ Although the Cuyahoga burning made national headlines, it was by no means a rare event. Rivers in Baltimore, Buffalo, Philadelphia, and Detroit all had river fires at around the same time.³⁸ Cuyahoga was thus neither the first river fire of the 1960s, nor the last.³⁹ The

32. See Lazarus, *supra* note 15, at 79 (analyzing the growth of public consciousness around environmental issues during the 1960s and 1970s).

33. See Madeline McDonel, *Silent Spring and the Modern Environmental Movement*, TEX. A&M UNIV. – CORPUS CHRISTI: S. TEX. STORIES, <https://library.tamucc.edu/exhibits/sts/page/silent-spring> [<https://perma.cc/5W8Y-EWRV>] (last visited Jan. 20, 2022); Robin McKie, *Rachel Carson and the Legacy of Silent Spring*, THE GUARDIAN (May 26, 2012, 7:05 PM), <https://www.theguardian.com/science/2012/may/27/rachel-carson-silent-spring-anniversary> [<https://perma.cc/2JSC-3VTS>].

34. Michael Rotman, *Lake Erie*, CLEV. HISTOR., <https://clevelandhistorical.org/items/show/58> [<https://perma.cc/5WXN-2GXB>] (last visited Jan. 20, 2022).

35. See Jack Lewis, *The Birth of EPA*, 11 EPA J., Nov. 1985, at 6, 6.

36. *Id.*

37. Tim Folger, *The Cuyahoga River Caught Fire 50 Years Ago. It Inspired a Movement*, NAT'L GEOGRAPHIC (June 21, 2019), <https://www.nationalgeographic.com/environment/2019/06/the-cuyahoga-river-caught-fire-it-inspired-a-movement> [<https://perma.cc/X3ZA-P5M6>].

38. Lorraine Boissoneault, *The Cuyahoga River Caught Fire at Least a Dozen Times, but No One Cared Until 1969*, SMITHSONIAN MAG. (June 19, 2019), <https://www.smithsonianmag.com/history/cuyahoga-river-caught-fire-least-dozen-times-no-one-cared-until-1969-180972444/> [<https://perma.cc/C9CN-TPU4>]; see also Hugh McDiiarmid, Jr., *When Our Rivers Caught Fire*, MICH. ENV'T COUNCIL (July 11, 2011), https://www.environmentalcouncil.org/when_our_rivers_caught_fire [<https://perma.cc/VQS7-CNA4>] (discussing John Hartig's book, *Burning Rivers – Revival of Four Urban Industrial Rivers that Caught on Fire*, which chronicles several rivers burning besides Cuyahoga); Jonathan H. Adler, *The Fable of the Burning River, 45 Years Later*, WASH. POST (June 22, 2014, 6:52 AM), <https://www.washingtontpost.com/news/volokh-conspiracy/wp/2014/06/22/the-fable-of-the-burning-river-45-years-later/> [<https://perma.cc/DJ66-JM3Z>] (stating that river fires were common in the late 19th and early 20th centuries, including in Baltimore, Detroit, Philadelphia, and Buffalo).

39. See Adler, *supra* note 38.

Santa Barbara oil spill of late 1969 resulted in the largest offshore contamination of U.S. water at that time, stretching from California to Mexico.⁴⁰ These televised ecological disasters created a strong public demand for federal regulatory stewardship.⁴¹ The spring of 1970 saw the first Earth Day, where millions of Americans celebrated nature and protested the despoiling of the planet; this remains the largest protest in U.S. history.⁴²

These events, and many others, led to the passage of a series of the strongest environmental statutes in U.S. history. On New Year's Day in 1970, President Nixon signed the National Environmental Policy Act (NEPA).⁴³ This statute requires the federal government to use all practicable means "to create and maintain conditions under which man and nature can exist in productive harmony."⁴⁴ Following NEPA, there was an active decade of environmental lawmaking: the Clean Air Act (1970),⁴⁵ the Clean Water Act (1972),⁴⁶ the Federal Insecticide, Fungicide and Rodenticide Act (1972),⁴⁷ the Endangered Species Act (1973),⁴⁸ the Resource Conservation and Recovery Act (1976),⁴⁹ and the Toxic Substance Control Act (1976)⁵⁰ were all passed during this time. Later, the detection of hundreds of hazardous waste sites, culminating in the Love Canal incident,⁵¹ led to the

40. See Jon Hamilton, *How California's Worst Oil Spill Turned Beaches Black and The Nation Green*, NPR (Jan. 28, 2019, 5:29 AM), <https://www.npr.org/2019/01/28/688219307/how-californias-worst-oil-spill-turned-beaches-black-and-the-nation-green> [<https://perma.cc/7XRF-4HE5>]; see also *45 Years After Santa Barbara Oil Spill, Looking at a Historic Disaster Through Technology*, NAT'L OCEANIC & ATMOSPHERIC ADMIN.: OFF. OF RESPONSE & RESTORATION, <https://response.restoration.noaa.gov/about/media/45-years-after-santa-barbara-oil-spill-looking-historic-disaster-through-technology.html> [<https://perma.cc/4VBN-THS5>] (Jan. 23, 2023).

41. See Lazarus, *supra* note 22, at 79–80.

42. *About Us: The History of Earth Day*, EARTHDAY.ORG, <https://www.earthday.org/history/> [<https://perma.cc/ET4E-L5F8>] (last visited Jan. 20, 2022).

43. Lewis, *supra* note 35, at 7; Lazarus, *supra* note 22, at 77; see also National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321–4370(m) (2018).

44. 42 U.S.C. § 4331(a)(2018); see also *What is the National Environmental Policy Act?: What Does NEPA require?*, U.S. ENV'T PROTECTION AGENCY, <https://www.epa.gov/nepa/what-national-environmental-policy-act#NEPA> [<https://perma.cc/E7PL-ZPGF>] (last visited Jan. 20, 2022).

45. Clean Air Act, 42 U.S.C. §§ 7401–7671(q) (2018).

46. Clean Water Act of 1977, 33 U.S.C. §§ 1251–1387 (2018).

47. Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 136 (2018).

48. Endangered Species Act of 1973, 16 U.S.C. §§ 1531–1544(2018).

49. Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901–6992(k) (2018).

50. Toxic Substance Control Act of 1976, 15 U.S.C. §§ 2601–2697 (2018).

51. See Robert D. McFadden, *Love Canal: A Look Back*, N.Y. TIMES (Oct. 30, 1984), <https://www.nytimes.com/1984/10/30/nyregion/love-canal-a-look-back.html> [<https://perma.cc/K7PC-S6UL>].

creation of the Comprehensive Environmental Response and Compensation Act (1980).⁵² To implement these statutes and better regulate industry, several environmental agencies were created: the Environmental Protection Agency (1970), the National Oceanic Atmospheric Administration (1970), and the Nuclear Regulatory Commission (1975).⁵³ The private sector was also racing to keep up with both the public pressure for enhanced environmental protections, and these new regulatory requirements, contributing to the rebirth of corporate social responsibility (CSR).⁵⁴

B. Corporate Social Responsibility to Protect the Environment

The rapid growth of the environmental movement brought about a resurgence of the debate over corporate social responsibility and corporate governance.⁵⁵ Milton Friedman famously stated that the primary purpose of corporations is to maximize profit for their shareholders.⁵⁶ This harkened back to *Dodge v. Ford*'s shareholder primacy, and that profits are the sole consideration of business officers and directors.⁵⁷ Many scholars and commenters (or "commentators") took issue with this philosophy of corporate governance and shareholder primacy, moving instead toward Berle's⁵⁸ theory of a corporation's larger role in society.⁵⁹ In 1981, Professor Kenneth R. Andrews of Harvard Business School observed:

If corporate power is to be regulated more by public law than by

52. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9601–9675(2018).

53. See *Origins of EPA*, *supra* note 22.

54. See Judy Oh, *3 Paradigm Shifts in Corporate Sustainability Marks New Era of ESG*, WORLD ECON. F. (Sept. 30, 2021), <https://www.weforum.org/agenda/2021/09/3-paradigm-shifts-in-corporate-sustainability-to-esg/> [<https://perma.cc/3NLV-B36M>].

55. See C.A. Harwell Wells, *The Cycles of Corporate Social Responsibility: An Historical Retrospective for the Twenty-First Century*, 51 U. KAN. L. REV. 77, 111 (2002).

56. See Milton Friedman, *A Friedman Doctrine—The Social Responsibility of Business Is to Increase Its Profits*, N.Y. TIMES (Sept. 13, 1970), <https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html> [<https://perma.cc/KYX3-9NMR>].

57. *Dodge v. Ford Motor Co.*, 170 N.W. 668 (Mich. 1919); see also Eric W. Orts, *Beyond Shareholders: Interpreting Corporate Constituency Statutes*, 61 GEO. WASH. L. REV. 14, 26 n.51 (1992).

58. But see Daniel R. Fischel, *The Corporate Governance Movement*, 35 VAND. L. REV. 1259, 1260 (1982) (arguing that "those who advocate the need for social change fail to understand the economics of the corporate form"). See generally A. A. Berle, Jr., *For Whom Corporate Managers Are Trustees: A Note*, 45 HARV. L. REV. 1365 (1932) (arguing for business responsibility to those besides shareholders).

59. See Wells, *supra* note 55, at 9. See generally E. Merrick Dodd, Jr., *For Whom Are Corporate Managers Trustees?*, 45 HARV. L. REV. 1145 (1932).

private conscience, a large part of our national energy will have to be spent keeping watch over corporate behavior, ferreting out problems, designing and revising detailed laws to deal with them, and enforcing those laws even as they become obsolete. . . . The alternative to much greater but still inadequate intervention by the state in economic affairs is for businessmen to assume responsibility early as a matter of conscience rather than accept it late as a matter of law.⁶⁰

The transformation of the corporate form ultimately leading to CSR has been traced back to Roman conceptions of the firm⁶¹. This transformation, in conjunction with stakeholder theory, massive corporate growth, and the increase in hostile takeovers, created a diverse coalition of interests in the late 1970s and early 80s.⁶² This alignment generated the perfect atmosphere for the formation of corporate constituency statutes.⁶³ Pennsylvania passed the first corporate constituency statute in 1983.⁶⁴ It specifically allowed directors, board committees, and individual officers the ability to consider the effect of their actions upon employees, suppliers, customers, and communities when making decisions regarding the best interests of the corporation.⁶⁵ Many other states soon followed suit and passed their own statutes, using Pennsylvania as a model governing business goals, interests, and operations.⁶⁶

By the early 1990s, the CSR and corporate constituency statutes provided fertile ground for the establishment of a new wave of corporate thinking: governance and reporting that came to be known as the Triple Bottom Line.⁶⁷ The phrase “triple bottom line” (TBL) was first coined by

60. Elliott J. Weiss, *Social Regulation of Business Activity: Reforming the Corporate Governance System to Resolve an Institutional Impasse*, 28 UCLA L. REV. 343, 346 (1981) (quoting Kenneth R. Andrews, *Public Responsibility in the Private Corporation*, 20 J. INDUS. ECON. 135, 138 (1972)).

61. Reuven S. Avi-Yonah, *The Cyclical Transformations of the Corporate Form: A Historical Perspective on Corporate Social Responsibility*, 30 DEL. J. CORP. L. 767, 770–73 (2005) (arguing that the dominant view of corporations throughout history was that they are separate entities controlled by their managers and that CSR was normatively acceptable even when it did not lead to the welfare of their shareholders).

62. See Orts, *supra* note 57, at 24 (arguing that politically diverse coalitions of stakeholders usually initiated these statutes).

63. *Id.*

64. See Act of Dec. 23, 1983, No. 1983-92, § 1(B), 1983 Pa. Laws 395 (codified at 15 PA. CONS. STAT. § 515 (1995)), *amended by* 15 PA. CONST. STAT. §§ 1715, 1716 (1990); see also Orts, *supra* note 57, at 25.

65. Orts, *supra* note 57, at 27.

66. *Id.*

67. See Afra Afsharipour & Shruti Rana, *The Emergence of New Corporate Social Responsibility Regimes in China and India*, 14 U.C. DAVIS BUS. L.J. 175, 187–89 (2014).

John Elkington in 1994 while working as a consultant (and co-founder) of the consulting business SustainAbility.⁶⁸ TBL consists of the 3Ps: people (social responsibility), planet (environmental responsibility) and profit (economic gains and losses).⁶⁹ In his book, *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*, Elkington predicts that reporting on environmental, social and economic information (TBL) will be a defining characteristic of corporate responsibility.⁷⁰ By the early 2000's, TBL (and the often interchangeable term "sustainable development," which has a different meaning and etymology)⁷¹ became part of the institutional framework of businesses.⁷² Powerful and influential institutions, firms, and businesses, such as the Global Reporting Initiative (GRI), the UN Environmental Programme (UNEP), the DOW Jones Sustainability Index, and various accounting firms, all actively encouraged business initiatives and reporting revolving around TBL and related concepts.⁷³

The acceptance of TBL (and sustainability) as a preferred method of doing business gave rise to the emergence of ways to encourage and measure business success in addressing environmental, social, and governance concerns (ESG).⁷⁴ The former Secretary General of the United Nations, Kofi Annan, began an international initiative in 2000 to bring companies and social organizations together to promote human rights, environmental protection, anti-corruption, and better working conditions (known as the UN Global Compact).⁷⁵ Later, Secretary General Annan asked more than fifty CEOs of major financial institutions to work under the Global Compact to integrate ESG into the markets.⁷⁶ In response, Morgan Stanley, BNP Paribas,

68. *Triple Bottom Line*, THE ECONOMIST (Nov. 17, 2009), <https://www.economist.com/news/2009/11/17/triple-bottom-line> [<https://perma.cc/A5A7-M6UM>].

69. *Id.*

70. See Markus J. Milne & Rob Gray, *W(h)ither Ecology? The Triple Bottom Line, the Global Reporting Initiative, and Corporate Sustainability Reporting*, 118 J. BUS. ETHICS 13, 14 (2013) (discussing the history of Triple Bottom Line); see also JOHN ELKINGTON, *CANNIBALS WITH FORKS: THE TRIPLE BOTTOM LINE OF 21ST CENTURY BUSINESS* (1997) (discussing the waves of environmental awareness and the origins of triple bottom line), <https://www.sdg.services/uploads/9/9/2/1/9921626/cannibalswithforks.pdf> [<https://perma.cc/96C8-BRAB>].

71. See generally Scott J. Shackelford, *The Future of Frontiers*, 23 LEWIS & CLARK L. REV. 1331 (2020).

72. See Milne & Gray, *supra* note 70, at 18.

73. *Id.*

74. See Pierre Allegaert, *Codetermination and ESG: Viable Alternatives to Shareholder Primacy?*, 52 N.Y.U. J. INT'L L. & POL'Y 641, 671 (2020) (noting "the tide began to turn" toward ESG in the mid-2000s).

75. See *id.* at 667 (discussing the origins of ESG).

76. *Id.*; see also Betsy Atkins, *Demystifying ESG: Its History & Current Status*, FORBES (June 8, 2020, 4:49 PM), <https://www.forbes.com/sites/betsyatkins/2020/06/08/demystifying>

Credit Suisse, Goldman Sachs, Deutsche Bank, and HSBC developed guidelines for integrating ESG issues into finance to increase shareholder value.⁷⁷ These businesses, holding over six trillion dollars in collective assets under management (AUM), encouraged businesses to adopt policies and reporting practices that consistently implemented ESG, as is discussed more fully below in Section I.C.⁷⁸ As of 2019, there were over 2,400 signatories to the Global Compact, representing over \$80 trillion dollars in AUM.⁷⁹

In sum, the environmental movement and its counterparts in social justice and corporate governance have potentially garnered the type of support few would have foreseen in the earlier years. However, it is important to not be complacent, and to critically examine the future of ESG. For example, do Elkington's predictions regarding the digital age create a new set of social issues that can benefit from and short-cut the long and arduous history of environmental law that has led to ESG?

C. *Understanding ESG+T*

Why expand the concept of ESG to ESG+T (to include technology)? Let us look at some of the key developments in the evolution of ESG first and then tackle why a notion of ESG+T makes sense in today's disruptive, technologically-enveloped world.

As was discussed earlier in Part I, the origins of the sustainability movement, and the eventual rise of ESG, date back to the 1980s when notions of "sustainability" and "corporate social responsibility" (CSR) were first formulated by both pressure groups and forward-thinking companies and their stakeholders, first in Europe, and more recently in North America, Asia, and Latin America.⁸⁰ These early notions of business responsibility and sustainability were more systematically directed at social and environmental issues, with governance being a much more distant consideration at the time.⁸¹

-esgits-history--current-status/ [https://perma.cc/DWJ9-PWTU] (discussing the history of ESG).

77. See Allegaert, *supra* note 74, at 667.

78. *Id.* at 668.

79. See Atkins, *supra* note 76.

80. See Mauricio Andrés Latapí Agudelo, Lára Jóhannsdóttir & Brynhildur Davídsdóttir, *A Literature Review of the History and Evolution of Corporate Social Responsibility*, 4 INT'L J. CORP. SOC. RESP. 1 (2019), <https://doi.org/10.1186/s40991-018-0039-y>.

81. See Wells, *supra* note 55, at 151 n.210 (stating that corporate governance was a main topic in its own right but it only peripherally touched corporate social responsibility; it only related to the internal corporate governance and not to the corporations relationship to non-shareholders). See generally Fischel, *supra* note 58, at 1273-79 (arguing in 1982 that those

In the late 1990s and early 2000s, important business and financial market developments arose, like TBL, to measure a company's results (to include social and environmental results as well as the traditional financial results) and "socially responsible investing" (SRI) directed at, developed, and deployed by the private and public investment, analytical, ratings, and asset management communities.⁸² At the time, most of the focus was on the "E" and the "S" of what later became ESG.⁸³ However, it was becoming increasingly clear that how corporate managers managed, and how boards oversaw management (in other words, governance), were an intrinsic part of the overall topic, even entering debates over the concept of sustainable development in international law.⁸⁴

Around this time, stock markets and indexes did not want to be left behind on addressing sustainability and corporate responsibility. Thus, we witnessed the emergence of the likes of the Dow Jones Sustainability Index and the FTSE4Good Index series at the turn of the century.⁸⁵ Also notable at the turn of the century, was the launch of the Global Reporting Initiative (GRI), which remains a highly respected independent standards organization focused on helping businesses, governments, and other organizations analyze and report key issues that fall within the universe of ESG issues, including corruption, human rights, and climate change.⁸⁶ In these developments we start to see the emergence of the "G" component of ESG, as topics like human rights and corruption fall squarely within the field of corporate governance, as well as qualifying as social issues⁸⁷.

Significantly to the climate-related challenges the world faces, a key development in the creation of environmental metrics was the founding, in

who argue that corporations have a social responsibility to consider the public welfare and that managers have a duty to consider those impacts misunderstand the managers' role in governing).

82. See Sarah Li Cain, *Socially Responsible Investing Can Help You Make a Positive Impact: Here's What You Need to Know*, CNBC (Aug. 1, 2021), <https://www.cnbc.com/select/socially-responsible-investing-what-you-should-know/> [<https://perma.cc/6LUT-ZZBW>].

83. See Latapí et al., *supra* note 80.

84. See MARIE-CLAIRE CORDONIER SEGGER & ASHFAQ KHALFAN, *SUSTAINABLE DEVELOPMENT LAW: PRINCIPLES, PRACTICES, AND PROSPECTS* 45 (2004).

85. See Borja Diez-Cañamero et al., *Measurement of Corporate Social Responsibility: A Review of Corporate Sustainability Indexes, Rankings and Ratings*, 12 *SUSTAINABILITY*, Mar. 10, 2020, at 1 (2020), <https://doi.org/10.3390/su12052153>.

86. See *Register Your Report*, GLOB. REPORTING INITIATIVE, <https://www.globalreporting.org/how-to-use-the-gri-standards/register-your-report/> [<https://perma.cc/TH9V-YHB8>] (last visited Jan. 21, 2022).

87. See Latapí et al., *supra* note 80, at 7–9 (discussing the operationalization of CSR by managers to fulfill the expectations of stakeholders including many socially responsible activities involving such things as the environment, human rights, anti-corruption, and labor).

2000, of the Carbon Disclosure Project, a U.K.-based global nonprofit that has helped both the private and public sectors in developing environmental impact metrics.⁸⁸ The impact of climate change, from a financial metrics standpoint, received a boost from the launch of the Task Force on Climate Related Financial Disclosure (TCFD) by the Financial Stability Board in 2015 to develop climate-related disclosures to assist investors, lenders, and insurers to make better informed decisions, on the one hand, and help stakeholders, to better understand climate related financial impacts, on the other hand.⁸⁹

The actual, literal notion of “ESG” was first formulated through the Global Compact, discussed above.⁹⁰ ESG first appeared as a concept in a joint communique from this group in 2004 declaring environmental, social, and governance matters as core to addressing and developing solutions to the planet’s greatest challenges.⁹¹ Related to this development was the launch of the UN Principles for Responsible Investment in 2006 and the independent International Integrated Reporting Council shortly thereafter.⁹² Also intricately related to these developments, but occurring a decade later, was the UN’s multi-stakeholder launch of the now omnipresent Sustainable Development Goals (SDG), which focus on seventeen core global ESG issues that the world must work on together to abate climate change, eradicate poverty and hunger, create equality and education, and many other laudable global goals.⁹³ The SDGs have become part of the corporate lingo, often interchangeable (though not really so) within discussions about ESG.

Finally, another major, more recent wave of developments, focuses on the development of both corporate metrics and agency rating systems. Notable in the former category was the creation, in 2011, of the Sustainable Accounting Standards Board (SASB), which since has become one of the key reporting systems companies use to self-evaluate on a spectrum of environmental, social, and governance issues (divided into five buckets) that

88. See CARBON DISCLOSURE PROJECT, <https://www.cdp.net/en> [<https://perma.cc/R4AS-ZWD6>] (last visited Jan. 21, 2022).

89. See TASK FORCE ON CLIMATE-RELATED FIN. DISCLOSURES, <https://www.fsb-tcfid.org/> [<https://perma.cc/K5RB-TQ43>] (last visited Jan. 21, 2022).

90. See *supra* Part I.B.

91. See George Kell, *The Remarkable Rise of ESG*, FORBES (July 11, 2018, 10:09 AM), <https://www.forbes.com/sites/georgkell/2018/07/11/the-remarkable-rise-of-esg/> [<https://perma.cc/B3GD-KR9G>].

92. See *About the PRI: How Did the PRI Start?*, PRINCIPLES FOR RESPONSIBLE INV., <https://www.unpri.org/about-us/about-the-pri> [<https://perma.cc/9Y24-34JN>] (last visited Nov. 30, 2022).

93. See *Sustainable Development Goals*, U.N. DIV. FOR SUSTAINABLE DEV. GOALS, <https://sdgs.un.org/goals> [<https://perma.cc/L87W-RGXW>] (last visited Jan. 21, 2022).

are tied to seventy-seven different industry sectors.⁹⁴ Amongst the notable ESG or sustainability ratings systems are the likes of Sustainalytics (which rates the ESG performance of listed companies), MSCI (which looks at a company's material ESG risks and rates them), S&P Global ESG Ratings, and RepRisk AG, which, among other things, has developed an SDG risk lens around an array of ESG risks.⁹⁵

Since the early 2000s, and especially in the last few years in North America, there has been a wave, and now a tsunami, of ESG-related activities. With the continuing growth and proliferation of ESG, government ESG regulations—especially in the EU, but also in the United States under the Biden Administration—are also increasing⁹⁶. Far from stopping it in its tracks, the COVID-19 pandemic has had the effect of turbocharging the evolution of ESG as a key portfolio of issues, risks, and opportunities for business, government, and civil society, so much so that, over the last year, many of the competing ratings and metrics developments that have been taking place over the past two decades have decided to join together.⁹⁷ The evolution in ESG is encapsulated in Figure 1.

94. See Ruth Jebe, *The Convergence of Financial and ESG Materiality: Taking Sustainability Mainstream*, 56 AM. BUS. L.J. 645, 646 (2019).

95. See Anna Hirai & Andrew Brady, *Managing ESG Data and Rating Risk*, HARV. L. SCH. F. ON CORP. GOVERNANCE (July 28, 2021), <https://corpgov.law.harvard.edu/2021/07/28/managing-esg-data-and-rating-risk/> [<https://perma.cc/MQ2S-RL67>].

96. See Veronica Poole and Kristen Sullivan, *Tectonic Shifts: How ESG is Changing Business, Moving Markets and Driving Regulations*, DELOITTE (October 29, 2021), <https://www2.deloitte.com/us/en/insights/topics/strategy/esg-disclosure-regulation.html> [<https://perma.cc/CMX6-5A4C>] (stating that across jurisdictions, regulators are creating rules that will require companies to disclose ESG information in their annual reports and regulatory filings. ESG concerns and investing are like a tectonic shift in business that set off a chain reaction for ESG regulations); see also Sofia Karadima, *Regulations are Pushing Investors to Embrace ESG*, INV. MONITOR (April 6, 2022), <https://www.investmentmonitor.ai/esg/esg-regulation-investors-climate-transparency-survey/> [<https://perma.cc/T6JL-M8MQ>] (stating that a higher interest in ESG has led to a global increase in ESG regulations and using an Ernst & Young report to show that ESG regulations have almost doubled in five years).

97. See IFRS Foundation Announces International Sustainability Standards Board, Consolidation with CDSB and VRF, and Publication of Prototype Disclosure Requirements, INT'L FIN. REPORTING STANDARDS FOUND. (Nov. 3, 2021), <https://www.ifrs.org/news-and-events/news/2021/11/ifrs-foundation-announces-issb-consolidation-with-cdsb-vrf-publication-of-prototypes/> [<https://perma.cc/36GF-LQFA>].

The Evolution of ESG

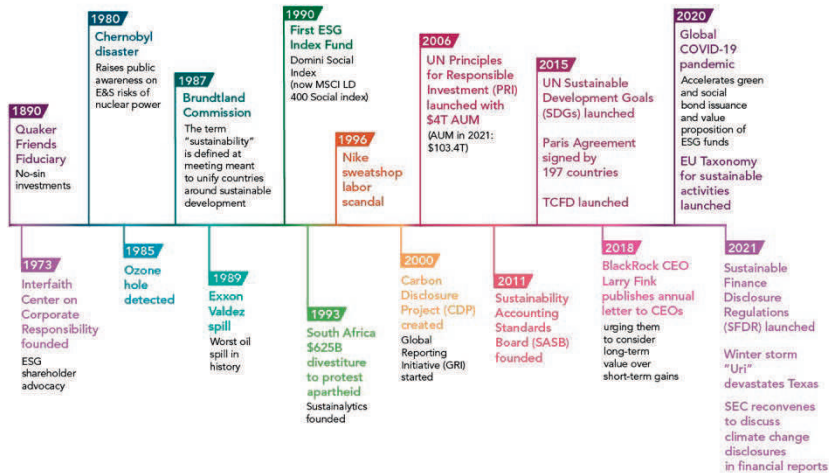


Figure 1. The Evolution of ESG⁹⁸

But there is one big gaping hole in this entire journey: where are technology issues represented in this multi-decade ESG evolution given the avalanche of new, often uncontrolled, unregulated technologies in the forms of AI, machine learning, facial recognition technology, IoT, cybersecurity, biotechnology, quantum, 5G, etc.? Suffice to say that several of these topics—namely data privacy and cybersecurity—have made it to the list of issues considered in some of the ESG reporting frameworks or rating agency evaluations. However, we have not seen a systematic consideration of technology issues, risks, and opportunities either comprehensively considered throughout the existing ESG taxonomy, or considered as part of a standalone category that we might call “T.”

So, why add “technology”—another layer of issues, risks, and opportunities that are not directly, or just barely, addressed—to the still-evolving ESG discussion? We argue that it is simple: technology issues—the good, the bad, and the ugly—suffuse everything we do, every minute and every hour of every day, and they require the attention of decision-makers everywhere because they are integral to everyday life, in the short term and the long term.

98. Rochelle March, *The ESG Explainer: Why ESG Data is Valuable for Supply Management*, DUN & BRADSTREET (July 8, 2021), <https://www.dnb.com/ca-en/perspectives/supply-chain/esg-data-valuable-for-supply-management-procurement.html> [<https://perma.cc/T64R-YW62>].

The concept of ESG+T was originally developed in *Gloom to Boom: How Leaders Transform Risk into Resilience and Value* to focus attention, resources, strategy, and governance, especially within organizations—whether in business, government, civil society, education, or others—to get leaders to deploy a holistic approach to their ESG+T intangible issues, risks, and opportunities in a coordinated and strategic manner that builds long-term sustainability, resilience, and value.⁹⁹ This is, needless to say, easier said than done, but it involves promoting transparency in ESG+T metrics to important stakeholders, especially investors and consumers. Before turning to efforts to do so through stepped-up disclosure laws and trustmarks, we first turn to an introduction of privacy and cybersecurity challenges in the IoT context.

II. INTERNET OF THINGS PRIVACY AND SECURITY CHALLENGES

The explosion in Internet-connected devices and services has supercharged prevailing security, privacy, and governance challenges that have been ubiquitous online since the early Internet worms and viruses were introduced in the 1970s.¹⁰⁰ The idea of connecting devices to the Internet to augment their capabilities is not a new one; such “intelligent” products were envisioned in the 1950s and 1960s.¹⁰¹ By the 1980s, smart sensors were being deployed in vending machines,¹⁰² but even through the 1990s, a combination of slow connection speeds, limited computational capabilities, and a lack of economies of scale for sensors and chips held back the Internet of Things.¹⁰³ All of that started to change in the 2010s, making the “Internet of Things” (IoT), a term reportedly coined by Kevin Ashton in 1999, a reality.¹⁰⁴ As of

99. For an in-depth discussion of this topic, see generally ANDREA BONIME-BLANC, *GLOOM TO BOOM: HOW LEADERS TRANSFORM RISK INTO RESILIENCE AND VALUE* (2020).

100. Creeper, for example, was an early self-replicating virus that was released on the ARPANET in 1971, nearly thirty years since the concept was first proposed by the economist John von Neumann in the 1940s. See Tim Matthews, *Creeper: The World's First Computer Virus*, EXABEAM (Mar. 5, 2019), <https://www.exabeam.com/information-security/creeper-computer-virus/> [<https://perma.cc/NHP6-K5M5>] (describing the Creeper computer virus).

101. See NILS J. NILSSON, *THE QUEST FOR ARTIFICIAL INTELLIGENCE: A HISTORY OF IDEAS AND ACHIEVEMENTS* 71 (2010).

102. *The Internet of Things: Groundbreaking Tech with Security Risks*, WELIVESECURITY (Oct. 29, 2015, 12:49 PM), <http://www.welivesecurity.com/2015/10/29/internet-things-groundbreaking-tech-security-risks/> [<https://perma.cc/KHY2-LBJH>] (“Researchers at Carnegie Mellon University first came up with an internet-connected Coke vending machine in 1982.”).

103. See JIM CHASE, TEX. INSTRUMENTS, *THE EVOLUTION OF THE INTERNET OF THINGS* (2013), www.ti.com/lit/ml/swrb028/swrb028.pdf [<https://perma.cc/D333-A75E>]; Scott J. Shackelford et al., *When Toasters Attack: A Polycentric Approach to Enhancing the “Security of Things,”* 2017 U. ILL. L. REV. 415, 422 (2017).

104. Kevin Ashton, *That ‘Internet of Things’ Thing*, RFID J. (June 22, 2009), www.rfidjo

2021, there were more than 12.3 billion Internet-connected devices, a figure growing at a 9% annual rate globally.¹⁰⁵

Yet such a tale is one-sided, ignoring the many security vulnerabilities and amassing technical debt related to such unbridled growth. Already, IoT has proven to be fertile ground for cyber attackers, as seen in the Mirai botnet that crashed servers managed by the leading Internet services firm Dyn.¹⁰⁶ Such episodes have led to a pessimistic view of IoT, as seen during the 2018 Black Hat cybersecurity conference, when for example, 93% of respondents “saw the future of IoT not necessarily as something smarter, but more dangerous, as they predict nation states will target or exploit connected devices in their droves over the coming year.”¹⁰⁷

The security challenges in the Internet of Things are exacerbated by a lack of clarity on what constitutes “reasonable” cybersecurity in this context, along with pervasive privacy challenges. Some states, such as California, have taken steps to address this issue. For example, as of January 2020, under California Senate Bill 327, “any manufacturer of a device that connects ‘directly or indirectly’ to the internet must equip it with ‘reasonable’ security features, designed to prevent unauthorized access, modification, or information disclosure.”¹⁰⁸ California has tied the definition of reasonability to common cybersecurity standards and frameworks such as the Center for Internet Security’s Critical Security Controls.¹⁰⁹ However, ongoing

urnal.com/articles/view?4986 [https://perma.cc/649K-H7WJ].

105. See Mohammad Hasan, *State of IoT 2022: Number of Connected IoT Devices Growing 18% To 14.4 Billion Globally*, IOT ANALYTICS (May 18, 2022), <https://iot-analytics.com/number-connected-iot-devices/> [https://perma.cc/2AEG-8UBV].

106. See Neena Kapur, *The Rise of IoT Botnets*, AM. SEC. PROJECT (Jan. 13, 2017), <https://www.americansecurityproject.org/the-rise-of-iot-botnets/> [https://perma.cc/Y9HT-SM99] (“A bot is defined as a computer or internet-connected device that is infected with malware and controlled by a central command-and-control (C2) server. A botnet is the term used for all devices controlled by the C2 server, and they can be used to carry out large scale distributed denial of service (DDoS) attacks against websites, resulting in an overload of traffic on the website that renders it unusable.”).

107. Charlie Osborne, *The Future of IoT? State-Sponsored Attacks, Say Security Professionals*, ZDNET (Aug. 13, 2018), <https://www.zdnet.com/article/the-future-of-iot-state-sponsored-attacks-say-security-professionals/> [https://perma.cc/4CRC-R8TG].

108. Adi Robertson, *California Just Became the First State with an Internet of Things Cybersecurity Law*, THE VERGE (Sept. 28, 2018, 6:07 PM), <https://www.theverge.com/2018/9/28/17874768/california-iot-smart-device-cybersecurity-bill-sb-327-signed-law> [https://perma.cc/T74L-ZJM5]; see also Lindsey O’Donnell, *IoT Security Regulation Is on the Horizon*, THREATPOST (June 6, 2019, 8:44 AM), <https://threatpost.com/iot-security-regulation-horizon/145406/> [https://perma.cc/M6NK-RFNF] (noting that the law requires “reasonable security feature or features that are appropriate to the nature and function of the device”).

109. *The 18 CIS Critical Security Controls*, CTR. FOR INTERNET SEC., <https://www.cisecurity.org/controls/cis-controls-list> [https://perma.cc/7NKQ-E5PA] (last visited Nov. 28, 2022).

confusion about the bounds of reasonability,¹¹⁰ combined with the challenge of effectively communicating such information to consumers, has limited the effectiveness of such interventions despite California's large economic footprint, especially in tech.¹¹¹

As is discussed in Part III, it has long been challenging to communicate essential information to both investors and consumers such as the environmental and energy costs of the products that they purchase.¹¹² Distilling and conveying nuances of cybersecurity, privacy, and larger data governance issues to consumers is another matter, especially when that information is combined with sustainability messaging given the swelling environmental cost of smart products.¹¹³ There is potential for ESG+T frameworks and labelling to help in this effort, but to be successful, lessons from the environmental experience, along with consumer psychology marketing, must be applied.

III. CRITIQUING ESG FRAMEWORKS AND INITIATIVES: INFORMING INVESTORS AND CONSUMERS

This Part begins with a brief critique of ESG frameworks building from the discussion in Part I. It then pivots to summarize the public and private regimes that are being used to better inform both investors and consumers about the ESG+T risks they are navigating in the IoT context.

A. Problems with ESG

The growth in environmental awareness and increased concern for common ecological inheritances has contributed to the uptake of ESG

110. See Dean Sysman, *California's IoT Security Law: Why It Matters and the Meaning of 'Reasonable Cybersecurity,'* FORBES (Nov. 20, 2019, 7:30 AM), <https://www.forbes.com/sites/forbestechcouncil/2019/11/20/californias-iot-security-law-why-it-matters-and-the-meaning-of-reasonable-cybersecurity/> [<https://perma.cc/G8LM-GTR4>].

111. See Sebastian Herrera & Abigail Summerville, *California Fostered America's Tech Industry. It Is Becoming a Great Adversary,* WALL ST. J. (Aug. 11, 2019, 3:25 PM), <https://www.wsj.com/articles/california-fostered-americas-tech-industry-it-is-becoming-a-great-adversary-11565532002> [<https://perma.cc/G3E2-5BR9>].

112. See, e.g., Rachel Deeley, *The Challenges of Labelling Sustainability,* THE BUS. OF FASHION (June 2, 2021), <https://www.businessoffashion.com/articles/sustainability/the-challenges-of-labelling-sustainability> [<https://perma.cc/W274-R7R3>].

113. See Callie Babbitt & Shahana Althaf, *Consumer Electronics Have Changed a Lot in 20 Years – Systems for Managing E-Waste Aren't Keeping Up,* THE CONVERSATION (Jan. 11, 2021, 8:14 AM), <https://theconversation.com/consumer-electronics-have-changed-a-lot-in-20-years-systems-for-managing-e-waste-arent-keeping-up-147972> [<https://perma.cc/E2UM-S3PY>].

investments, as was discussed in Part I.¹¹⁴ The soaring attention to ESG investing has reshaped equity and fixed income markets.¹¹⁵ Thus, the ability of investors, lenders, suppliers, customers, and even governments to rely upon reliable, consistent, and comparable ESG information is now essential.¹¹⁶

The history of ESG is directly correlated to the environmental and social movements that shaped America (both the failures and successes); yet even though U.S.-based movements helped to pioneer ESG tools and practices, in many ways the United States is lagging behind Europe and has for decades. Still, with each generation there has been an increasing expectation that corporations should commit to improving various nontraditional outcomes—ranging from addressing inequality, diversity representation, and climate change.¹¹⁷ Many informed investors seek investments that follow the SDGs, for example, so that their portfolios reflect their concerns regarding diversity, ecology, and equality, as well as profit.¹¹⁸ Indeed, nearly all large institutional investors utilize ESG in some way relative to investment decisions.¹¹⁹ The dilemma is that investors require ESG transparency, disclosures, and reporting, yet there are no clear uniform requirements or systems for ESG reporting and disclosures. For instance, most sustainability information is not disclosed in financial or securities filings; rather, it is noted in standalone reports that have been shown to be inconsistent and often unreliable.¹²⁰ These reports are usually not prepared

114. See Daniel C. Esty & Todd Cort, *Sustainable Investing at a Turning Point*, in *VALUES AT WORK: SUSTAINABLE INVESTING AND ESG REPORTING* 3, 4 (Daniel C. Esty & Todd Cort eds., 2020) (attributing the growth of sustainable investing to the mainstream adoption of ESG metrics); March, *supra* note 98 (exploring the reasons why ESG has become more mainstream).

115. See Esty & Cort, *supra* note 114, at 5 (stating the fact that green bonds grew from \$2.6 billion to \$257 billion from 2012 to 2019 alone).

116. See Alexandra Thornton & Tyler Gellasch, *The SEC Has Broad Authority to Require Climate and Other ESG Disclosures*, *CTR. FOR AM. PROGRESS* (June 10, 2021), <https://www.americanprogress.org/article/sec-broad-authority-require-climate-esg-disclosures/> [<https://perma.cc/HRE5-VDE3>] (discussing the increased demand for SEC rules governing ESG related investment risks).

117. See March, *supra* note 98 (discussing the public pressure on companies to commit to improving social outcomes).

118. See *id.* (citing the growing number of investors who want to align their investments with their values).

119. See Diane Strauss, Aisha I. Saad, *Can Investors Rely on Corporate Sustainability Commitments?*, in *VALUES AT WORK*; *supra* note 114, at 195, 197 (noting that 82% of investors consider ESG data when making investment decisions).

120. See Jill E. Fisch, *Making Sustainable Disclosure Sustainable*, 50 *ENV'T L. REP.* 10638, 10640 (2020) (describing the fragmented, inconsistent, and unreliable regime for sustainability disclosures).

by lawyers skilled in disclosure laws, not reviewed by C-suite officials or board members, and not overseen by third party auditors.¹²¹ Instead, the documents are often prepared by marketing or public relations personnel, so they do not meet the standards for securities filings.¹²² Some mutual funds simply rebranded themselves or changed their strategy to emphasize ESG; and to highlight companies they hold that are more ESG oriented.¹²³

The bar for what constitutes corporate social responsibility and sustainable business practices is thus absurdly low, contributing to greenwashing.¹²⁴ Actual business behavior may not be reflected by ESG labels or rankings. In fact, most ratings do not have anything to do with actual corporate responsibility as it relates to ESG factors.¹²⁵ Instead, what they do measure is “the degree to which a company’s economic value is at risk due to ESG factors.”¹²⁶

Consequently, despite the success of ESG frameworks, both investors and consumers are still often left wanting reliable information to guide their investments and purchases. Regulators, industry itself, and civil society have stepped in to help in this effort, as is discussed next.

B. Informing Investors

Investors in publicly traded firms benefit from a range of disclosure requirements. As this Section explores, the Securities and Exchange Commission (SEC) has been active in both the sustainability and, recently increasingly, the cybersecurity contexts, as have states and the private sector.

1. SEC’s Role in Regulating ESG+T

Since its inception, the SEC has had the authority to require disclosures; a response to the 1929 market crash that resulted in the Great Depression.¹²⁷

121. *Id.*

122. *Id.*

123. See Dieter Holger, *As Funds Jump on the ‘Sustainable’ Bandwagon, Regulators Raise Concerns*, WALL ST. J. (Apr. 5, 2020, 10:08 PM), <https://www.wsj.com/articles/as-funds-jump-on-the-sustainable-bandwagon-regulators-raise-concerns-11586103274> [<https://perma.cc/RT7N-ZJ82>] (scrutinizing funds’ ESG superficial rebranding efforts).

124. See Hans Taparia, *The World May Be Better Off Without ESG Investing*, STAN. SOC. INNOVATION REV. (July 14, 2021), https://ssir.org/articles/entry/the_world_may_be_better_off_without_esg_investing [<https://perma.cc/K4QV-T6CV>] (arguing the ESG investing has, on the whole, contributed to destabilizing society).

125. *Id.*

126. *Id.*

127. See SEC: *Securities and Exchange Commission*, HISTORY (Dec. 6, 2019), <https://>

During that time, only a small percentage of Americans owned stock.¹²⁸ However, the entire population was affected by the market turmoil and economic collapse.¹²⁹ Federal laws were enacted and reformed to help guard against such an eventuality recurring. The basic premise of federal securities laws evolved to focus on disclosure. Traditionally, securities law did not concern itself directly with corporate conduct, rights, and obligations, which are the province of state corporate law.¹³⁰

As sustainability and climate change became a more prominent business concern over the course of the twentieth and into the twenty-first century, the SEC began issuing guidance to assist companies in utilizing SEC disclosures relative to climate change.¹³¹ Their 2010 guidance called upon businesses to disclose the potential effects of pending legislation or regulation; businesses would also have to consider disclosure, if material, of the difficulties involved in assessing the timing and effect of the pending legislation or regulation (positive and negative).¹³² The SEC also advises businesses to disclose potential obligations related to international accords and to monitor the progress of any potential agreements that could materially impact the business.

www.history.com/topics/us-government/securities-and-exchange-commission [<https://perma.cc/DE3W-WLK4>] (describing how the SEC was created as part of the New Deal in response to the market crash and to fight the effects of the Great Depression). See generally Steve Fiorillo, *Great Depression: Causes, Effects and Timeline*, THE STREET (July 14, 2019, 10:04 AM), <https://www.thestreet.com/politics/great-depression-causes-14663720> [<https://perma.cc/6KNQ-MMAA>] (charting the causes and effects of the Great Depression in the United States).

128. See Thornton & Gellasch, *supra* note 116 (quoting Professor Cynthia Williams, who states that only a small proportion of the U.S. population owned stock in 1930); see also Thomas Schwartz, *The Great Stock Market Crash of 1929: Why History Textbooks and the Conventional Wisdom Get it Wrong*, HOOVER HEADS (June 15, 2022), <https://hoover.blogs.archives.gov/2022/06/15/the-great-stock-market-crash-of-1929-why-history-textbooks-and-the-conventional-wisdom-get-it-wrong/> [<https://perma.cc/44JZ-5TQJ>] (stating that only 2.5% of Americans owned stock, and that most Americans were not active in the stock market directly or indirectly at the time of the 1929 market crash).

129. *Id.*

130. See Thomas Lee Hazen, *Social Issues in the Spotlight: The Increasing Need to Improve Publicly-Held Companies' CSR and ESG Disclosures*, 23 U. PA. J. BUS. L. 740, 749, 752 (2021) (providing an overview of SEC disclosures and describing how the pressure from socially responsible institutional investors has forced businesses to self-disclose).

131. See Paul A. Davies, Paul M. Dudek & Kristina S. Wyatt, *Recent Developments in ESG Reporting*, in *VALUES AT WORK: SUSTAINABLE INVESTING AND ESG REPORTING*, *supra* note 114, at 161, 165 (surveying the current state of ESG disclosure rules and anticipating significant changes in the coming years).

132. See Commission Guidance Regarding Disclosure Related to Climate Change, 75 Fed. Reg. 6290, 6295–96 (Feb. 8, 2010) (providing guidance to public companies about current disclosure requirements relating to climate change matters).

More recently, there has been mounting pressure to specifically include ESG within the panoply of SEC mandated transparency and disclosures necessary to protect investors. Currently, though, there are no SEC disclosure regulations that directly address ESG in a holistic fashion. This has led to financial “greenwashing,”¹³³ so much so that the SEC is currently investigating Wall Street usage of ESG and related terms.¹³⁴

In March 2020, SEC’s Investment Advisory Committee urged the creation of standardized ESG disclosure regulations, noting: “Investment and voting based in part on ESG disclosure is front and center in today’s global investment ecosystem. Major business risks, decisions, and strategies stand upon ESG factors and investors are not being served or protected by piecemeal, ad hoc, inconsistent information currently in the mix.”¹³⁵

The SEC formed an ESG task force in March of 2021 focusing on identifying “material gaps or misstatements in issuers’ disclosures of climate risks under existing rules.”¹³⁶ In April of 2021, the SEC issued a “Risk Alert” to inform the public of occurrences of misleading statements regarding ESG investing processes and representations relative to global environmental frameworks.¹³⁷ The federal division warned of several observations of deficiencies and weakness relating to ESG investing processes and representations, such as portfolio management practices inconsistent with disclosures about ESG approaches, inadequate controls to ensure ESG-related disclosures and marketing are inconsistent with the firm’s practices, and unsubstantiated or otherwise misleading claims regarding ESG approaches.¹³⁸ Companies recognize the deficiencies, and many are looking to the SEC for regulatory leadership. Recently, several C-suite executives

133. See Martin A. McCrory & Kyle T. Langvardt, *Cutting Out the Middle-Man: The Case for Direct Business Involvement in Environmental Justice*, 55 BUS. HORIZONS 357, 358 (2012) (describing the origin and meaning of “greenwashing”).

134. See Holger, *supra* note 123 (stating that SEC is looking closely at ESG funds because of the lack of standardization and potential greenwashing).

135. See Davies et al., *supra* note 131, at 163 (explaining the consequences of the SEC’s limited and high-level guidance regarding ESG disclosures).

136. See *SEC Announces Enforcement Task Force Focused on Climate and ESG Issues*, U.S. SEC. & EXCH. COMM’N (Mar. 4, 2021), <https://www.sec.gov/news/press-release/2021-42> [<https://perma.cc/4W3A-836T>].

137. See DIV. OF EXAMINATIONS, U.S. SEC. & EXCH. COMM’N, RISK ALERT: THE DIVISION OF EXAMINATIONS’ REVIEW OF ESG INVESTING 3–4 (2021), <https://www.sec.gov/files/esg-risk-alert.pdf> [<https://perma.cc/Y6BB-2U56>].

138. *Id.* at 4 (giving the example of fund holdings predominated by low ESG scores where the predominance was inconsistent with the firm’s stated approaches, unsubstantiated claims regarding their contributions to ESG when in fact their role was inconsequential, and statements that a fund investment had received a high score for each ESG component when it actually relied upon a composite ESG score).

issued a report that revealed that companies were “all over the map” when it came to ESG disclosures, and that companies overwhelmingly seek direction on ESG disclosure from the SEC.¹³⁹ Despite the call for SEC action, the SEC issued a rule in 2020 that limited shareholder proposals under Rule 14a-8. The change makes it more difficult for small shareholders to be heard at a time when more shareholders are using this device to affect corporate ESG and climate policy.¹⁴⁰

As with ESG, the SEC is also ramping up cybersecurity disclosure requirements for investors, including material risks and media disclosures such as a firm having “strong cybersecurity procedures.”¹⁴¹ This process began in 2011, when the SEC failed to require covered firms to disclose all cyber-attacks, although it did interpret its existing regulations broadly in requiring disclosure of “material” attacks leading to financial losses.¹⁴² What counts as “material” has been expanding over the following decade. By 2018, a broad range of cyber risks were being defined as material by the SEC, and the SEC issued guidance to encourage firms to disclose cyber risks based on “the probability of a cybersecurity breach, the magnitude of a past breach, and the importance of compromised data.”¹⁴³ Further amendments to the so-called “Safeguards Rule,” which “requires registrants to adopt policies and procedures reasonably designed to protect customer records and

139. See Al Barbarino, *Cos. ‘Begging’ for ESG Guidance From SEC, Report Says*, LAW360 (Sept. 1, 2021, 6:19 PM), <https://www.law360.com/articles/1418031/> [<https://perma.cc/2W3E-FSNM>] (citing the report published by analytics provider Intelligize and quoting report co-chair Rob Peters).

140. See Cynthia A. Williams & Donna M. Nagy, *ESG and Climate Change Blind Spots: Turning the Corner on SEC Disclosure*, 99 TEX. L. REV. 1453, 1466 (2021) (discussing the changes to the shareholder proposal rule and questioning the logic of the changes during this time period).

141. See Kenneth Breen, Phara Guberman & Sachin Bansal, *SEC Actions Up the Ante for Cybersecurity Disclosures*, BLOMBERG L. (Sept. 14, 2021, 4:01 AM), <https://news.bloomberglaw.com/securities-law/sec-actions-up-the-ante-for-cybersecurity-disclosures> [<https://perma.cc/44XD-7PLN>] (“Recent SEC enforcement actions are a warning that cybersecurity issues need to be treated as seriously as all other disclosure obligations.”).

142. See *CF Disclosure Guidance: Topic No. 2*, U.S. SEC. & EXCH. COMM’N (Oct. 13, 2011), <https://www.sec.gov/divisions/corpfin/guidance/cfguidance-topic2.htm> [<https://perma.cc/3VS8-RV7G>] (describing the SEC’s view on cybersecurity disclosure obligations); Joel Bronstein, *The Balance Between Informing Investors and Protecting Companies: A Look at the Division of Corporation Finance’s Recent Guidelines on Cybersecurity Disclosure Requirements*, 13 N.C. J.L. & TECH. 257, 271 (2012) (citing *TSC Indus., Inc. v. Northway, Inc.*, 426 U.S. 438, 449 (1976), which defined “material” as “a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the ‘total mix’ of information made available.”).

143. See Breen et al., *supra* note 141.

information,”¹⁴⁴ are reportedly forthcoming in 2022, as of this writing.¹⁴⁵

On August 30, 2021, the SEC announced enforcement actions with eight investment advisory firms and broker-dealers, reporting violations with the Safeguards Rule.¹⁴⁶ This is noteworthy as each of these firms “appeared to have cybersecurity policies in place that would likely have survived regulatory scrutiny,” but still suffered breaches related to personal identifiable information (PII) due to these policies not being enforced.¹⁴⁷ In describing this decision, it is noteworthy that Kristina Littman, chief of the SEC Enforcement Division’s Cyber Unit, said, “[i]t is not enough to write a policy requiring enhanced security measures if those requirements are not implemented or are only partially implemented, especially in the face of known attacks.”¹⁴⁸ This can include both delays of firm-wide cybersecurity guidance, such as in the case of KMS financial advisers, or simply not following the written cybersecurity policies, as in Cetera Entities.¹⁴⁹ Looking ahead, the trend seems to be toward greater transparency, and stepped-up disclosure requirements, which will likely be reinforced through state-level laws and private-sector initiatives.

2. State Response

While federal securities law should provide a direct route toward the disclosure of ESG related risks and activities, states also have a share in this responsibility.¹⁵⁰ States have the power to pursue securities fraud actions via enforcement powers granted to a state attorney general or a state commissioner.¹⁵¹ Each state has its own securities regulators and regulations (or similar consumer protection laws). States use these to investigate non-

144. Alan Friedman et al., *SEC Continues Focus on Cybersecurity in Three New Actions Targeting Investment Advisers and Broker Dealers*, JDSUPRA (Sept. 13, 2021), <https://www.jdsupra.com/legalnews/sec-continues-focus-on-cybersecurity-in-1858934/> [<https://perma.cc/DTY8-ECHZ>].

145. See Dan Primack, *SEC Goes on Rule-Making Spree*, AXIOS (Dec. 16, 2021), <https://www.axios.com/2021/12/16/sec-rule-making-spree> [<https://perma.cc/FWP2-NAW5>] (providing an overview of recent SEC proposals regarding executive stock trading and corporate share buybacks).

146. See Breen et al., *supra* note 141.

147. *Id.*

148. *Id.*

149. *Id.*

150. See Hana V. Vizcarra, *Climate-Related Disclosure and Litigation in the Oil & Gas Industry: Will State Attorneys General Investigations Impede the Drive for More Expansive Disclosures?*, 43 VT. L. REV. 733, 759 (2019) (explaining the role of state commissioners and attorneys general in corporate climate disclosures).

151. *Id.*

disclosure as part of their efforts relating to fraud, consumer protection, and securities regulation.¹⁵²

In 1911, Kansas became the first state to enact laws specifically regulating securities.¹⁵³ Other states soon followed, in an effort, to protect investors in the ever-growing securities market. However, twenty years of state regulatory effort did not prevent the national market crash ushering in the Great Depression.¹⁵⁴ Nevertheless, some form of “Blue Sky” laws are legislated in every state to protect the investing public.¹⁵⁵ A Blue Sky law is a state law in the United States that regulates the offering and sale of securities to protect the public from fraud.¹⁵⁶ With the lack of direct federal action governing the ever-increasing need for standardized ESG disclosures and regulations, states have taken on the responsibility.

For example, the California Transparency in Supply Chains Act of 2010 requires covered companies to disclose on their websites their efforts to combat human trafficking and forced labor in their supply chains.¹⁵⁷ The law applies to retailers and manufacturers with “annual worldwide gross sales over \$100 million that do business in California.”¹⁵⁸ More recently, in January 2019, Illinois promulgated the most direct ESG rules of any state.¹⁵⁹ It required public investment leaders to incorporate sustainability factors into their investment decisions.¹⁶⁰ California recently created a law that requires all corporations to operate within the state to have a specified number of people from marginalized groups on their board of directors.¹⁶¹ This law expands the possibility of how corporations can be made to be more socially

152. See JOHN HILL, ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG) INVESTING: A BALANCED ANALYSIS OF THE THEORY AND PRACTICE OF A SUSTAINABLE PORTFOLIO 105 (2020) (discussing the different types of regulatory layers governing the U.S. equities market).

153. See Eric C. Chaffee, *Securities Regulation in Virtual Space*, 74 WASH. & LEE L. REV. 1387, 1401–02 (discussing the origin and history of Blue Sky laws).

154. *Id.*

155. See Chandler Farnworth, *Do Shareholders Have the Power? Climate Change as a Material Risk*, 34 TUL. ENV'T L.J. 149, 156 n.56 (2021).

156. See *Blue Sky Laws*, INVESTOR.GOV, <https://www.investor.gov/introduction-investing/investing-basics/glossary/blue-sky-laws> [<https://perma.cc/2MCP-2C4S>] (last visited Dec. 5, 2022).

157. See California Transparency in Supply Chains Act of 2010, 2010 Cal. Legis. Serv. Ch. 556 (West) (codified as amended at CAL. CIV. CODE § 1714.43 (West 2012)).

158. *Navigating State Regulation of ESG Investments by Investment Managers: A Rapidly Evolving and Contradictory Landscape*, ROPES & GRAY (June 30, 2021), <https://www.ropesgray.com/en/newsroom/alerts/2021/June/Navigating-State-Regulation-of-ESG-Investments-by-Investment-Managers-A-Rapidly-Evolving> [<https://perma.cc/J7BA-ZJ4H>].

159. *Id.*

160. *Id.*

161. See Audra L. Savage, *Aunt Jamima's Resignation Letter*, 121 COLUM. L. REV. F. 186, 214 (2021) (discussing a state's ability to hold corporations accountable).

accountable in regard to diversity.¹⁶²

Recent state ESG movements have also included several ESG measures proscribing certain investments and prescribing others. In September 2020, the Oregon Investment Council authorized a policy that formally included ESG factors in investment decisions; the Council will consider these factors in its \$107 billion investment portfolio.¹⁶³ New Jersey, New York, and Maine followed suit by introducing more direct ESG legislation and policies.¹⁶⁴ New Jersey's legislation would prohibit investment of its retirement funds in certain companies holding large carbon content reserves, and New York's Comptroller adopted a goal to transfer its \$226 billion retirement fund to net zero investments by 2040.¹⁶⁵ In June of 2021, the Maine legislature passed a statute that divests all public assets from fossil fuels by January 2026, including \$17 billion in funding from the state pension fund and treasury.¹⁶⁶ Although helpful, laws like these have aided in the patchwork condition of state ESG-related policies; there is no consistent regulatory scheme that companies or investors can rely upon for guidance. Similarly, due to the lack of comprehensive federal data breach notification laws, the fifty different state-level disclosure laws are fragmented, which means that different types of cyber-attacks are disclosed at different times, and in different manners, across the nation with no authoritative public database to help guide investors.¹⁶⁷

3. Private Response

The need for ESG disclosure and transparency has dramatically changed since the early 2000s, so much so that it is firmly entrenched as a market reality.¹⁶⁸ The absence of mandatory ESG disclosures has resulted in the creation of a de facto voluntary ESG regime.¹⁶⁹ Larry Fink, CEO of

162. *Id.*

163. *See* ROPES & GRAY, *supra* note 158.

164. *Id.*

165. *Id.*

166. *Id.*

167. *See Data Beach Response: A Guide for Business*, F. TRADE COMM'N (Feb. 2021), <https://www.ftc.gov/tips-advice/business-center/guidance/data-breach-response-guide-business> [<https://perma.cc/54EM-9YMV>] (noting that all states have their own laws and regulations in addition to federal law).

168. *See* Pierre J. Allegaert, *Codetermination and ESG: Viable Alternatives to Shareholder Primacy?*, 52 N.Y.U. J. INT'L L. & POL. 641, 671 (2020) ("Investor demand for reporting on ESG issues is no longer a laughable proposition, but instead a firmly entrenched market reality.").

169. *See* Hazen, *supra* note 130, at 749 (describing how the pressure from socially responsible institutional investors has forced businesses to self-disclose).

Blackrock (the world's largest asset manager, handling over \$9.5 trillion in assets by the end of 2021), stated in his 2018 annual letter to CEOs that managing ESG is essential to growth.¹⁷⁰ In 2020, KPMG announced that it had a goal of becoming a net-zero carbon company by 2030 and using 100% renewable electricity in all of its Board Countries by 2022.¹⁷¹ The refining industry has reported carbon reduction goals and strategies as well. Valero stated that its ongoing initiatives would collectively enable it to cut its greenhouse gas emissions by more than 70% by 2025.¹⁷² Marathon and Phillip 66 announced plans to partner with Southwest Airlines to sell its fuel produced from their repurposed renewable diesel facilities.¹⁷³ ExxonMobil also announced plans to source renewable diesel from its clean energy plant in California.¹⁷⁴ Along these lines, in 2020, Fidelity became a founding signatory of the Net Zero Asset Managers Initiative, which plans to support investments that reach net zero by 2050, and introduced an environmental rating system that grades more than four thousand companies on characteristics such as emissions reduction, water usage, biodiversity, and climate risk, within its proprietary ESG ratings framework.¹⁷⁵ More companies are also including cybersecurity and privacy information as part of their integrated sustainability reports.¹⁷⁶

However, private ESG statements, goals, reporting, and analysis are suspicious for many reasons. Though the statements of companies are laudable, they represent goals that have yet to be realized and the actual

170. See LAWRENCE M. HEIM, *KILLING SUSTAINABILITY: BLUNT TRUTHS ABOUT CORPORATE SUSTAINABILITY/SOCIAL RESPONSIBILITY FAILURES AND HOW TO AVOID THEM* 1 (2018).

171. See, e.g., Kathryn Wright, *KPMG Announces It Will Be Net-Zero Carbon by 2030*, KPMG (Nov. 9, 2020), <https://web.archive.org/web/20201109141030/https://home.kpmg/xx/en/home/media/press-releases/2020/11/kpmg-announces-it-will-be-net-zero-carbon-by-2030.html> (describing KPMG's carbon commitment). KPMG has since removed the press release from its website and reframed its goal as "a science-based target (SBT) aligned with a 1.5°C trajectory." *Planet: Decarbonization*, KPMG, <https://home.kpmg/xx/en/home/insights/2022/03/our-impact-plan-planet.html#decarbonization> [<https://perma.cc/ERG4-FXYR>].

172. See Swati Singh, *ESG Trends in Refining*, ADI ANALYTICS (Apr. 27, 2021), <https://adi-analytics.com/2021/04/27/esg-trends-in-refining/> [<https://perma.cc/M7YP-NFZ6>] (describing ESG trends in refining).

173. *Id.*

174. *Id.*

175. See Jenn-Hui Tan, *Sustainable Investing Report 2021: Introduction*, FIDELITY INT'L (July 29, 2021), <https://www.fidelityinternational.com/editorial/article/sustainable-investing-report-2021-introduction-time-to-step-up-1a59ea-en5/> [<https://perma.cc/67LG-SMSS>] (describing Fidelity's sustainability goals).

176. See NASDAQ, 2018 SUSTAINABILITY REPORT 14 (2018), https://www.nasdaq.com/docs/2020/02/06/2018_Sustainability_Report.pdf (describing trends in ESG initiatives across markets).

effect upon the environment are yet to be seen. As far as ESG analysis, most of the data that is factored into ESG analyses comes from companies' voluntary disclosures or survey responses to rating firms' questionnaires.¹⁷⁷ What is even more interesting is the fact that ESG definitions and standards are heavily influenced by only four market-leading rating companies that compete among themselves to provide ESG metrics: MSCI ESG, Sustainalytics, RepRisk, and ISS.¹⁷⁸ Altogether, these four businesses rank more than 100,000 companies across dozens of industries and sectors, and rate more than 400,000 equity and fixed-income securities.¹⁷⁹ They also greatly influence the market for ESG ratings because they are consistently chosen by the world's leading investment vehicles, such as BlackRock, State Street Global Advisors, and others.¹⁸⁰

Yet, from business to business, the methodology, quantity, and quality of the data and analysis is quite disparate, leading one commentator to report: "Each rating agency has a customized scoring method which evaluates different non-financial metrics and frequently disagree about the components of ESG. . . . Core ESG metrics vary from as few as twelve performance indicators to as many as 1,000."¹⁸¹ The ever-present contradiction between "the importance of ESG data for investors, and the inability of data providers to clearly explain their sourcing and rating methodology, creates a dilemma for financial services actors who seem to opt for a third method: external sourcing and internal data processing."¹⁸² This new trend is demonstrated by Sustainalytics, which has been selling raw data since 2020 as part of its new business model.¹⁸³

In 2019, the Business Roundtable, an association of over 200 leading U.S. CEOs, demonstrated a purported commitment to ESG by declaring,

177. See John Coates, *ESG Disclosure – Keeping Pace with Developments Affecting Investors, Public Companies and the Capital Markets*, U.S. SEC. & EXCH. COMM'N (Mar. 11, 2021), <https://www.sec.gov/news/public-statement/coates-esg-disclosure-keeping-pace-031121> [<https://perma.cc/N84U-G8P9>].

178. TIMOTHY M. DOYLE, AM. COUNCIL FOR CAP. FORMATION, RATINGS THAT DON'T RATE: THE SUBJECTIVE WORLD OF ESG RATINGS AGENCIES 7 (2018), https://accfcorgov.org/wp-content/uploads/2018/07/ACCF_RatingsESGReport.pdf [<https://perma.cc/YL8R-MCMU>].

179. *Id.*

180. *Cf. id.* (showing that MSCI, Sustainalytics, RepRisk, and ISS are used by top global asset managers).

181. *Id.* at 8.

182. *The ESG Data Market: Changes and Challenges for Financial Players*, SIA PARTNERS (Apr. 2, 2021), <https://www.sia-partners.com/en/news-and-publications/from-our-experts/esg-data-market-changes-and-challenges-financial-services> [<https://perma.cc/C78Z-PRH5>].

183. *Id.*

“companies should serve not only their shareholders, but also deliver value to their customers, invest in employees, deal fairly with suppliers and support the communities in which they operate.”¹⁸⁴ Still, the statement itself does nothing to change or mandate actual corporate behavior relative to ESG or transparency. In fact, some believe the statement was merely a greenwashing effort to drive sales, appease shareholders and/or forestall potential regulations.¹⁸⁵ Actual ESG initiatives often remain tangential to core corporate endeavors. To effect real change, the Board, CEOs, and managers must sincerely believe that ESG is important to the business and shareholders.¹⁸⁶ They must create a situation where Chief Sustainability Officers work directly with the Chief Financial Officers to achieve purported ESG goals.¹⁸⁷ Without this, investors are often misled because they believe that ESG is an actual promise to adhere to a business strategy when it is actually a mere goal that is used as a label or branding mechanism.¹⁸⁸ Moreover, ESG labels that are used are so broad and vague that investors are left without a clear understanding of how they are investing, and any ESG are so unclear (and varied) that investors cannot know what they are actually getting.¹⁸⁹

4. Proposed Rules and Legislation

There are two major legislative pushes that have recently come to the forefront of the ESG investor debate—one involving SEC regulatory reform, and the other involving Department of Labor (DOL) ERISA reform.

First, recognizing the need for objective, clear, and uniform ESG metrics and disclosures, Representative Juan Vargas introduced the ESG Disclosure Simplification Act.¹⁹⁰ In June of 2021, by a 215-214 vote, the

184. *One Year Later: Purpose of a Corporation*, BUS. ROUNDTABLE, <https://purpose.businessroundtable.org/> [<https://perma.cc/P6CN-W68K>] (last visited Jan. 22, 2022); see also Amanda M. Rose, *A Response to Calls for SEC-Mandated ESG Disclosure*, 98 WASH. U. L. REV. 1821, 1823 (2021) (questioning the efficacy of, and motivations behind, current ESG efforts).

185. See Rose, *supra* note 184, at 1823.

186. See KPMG, *THE ESG JOURNEY: LESSONS FROM THE BOARDROOM AND C-SUITE 9* (2018), <https://boardleadership.kpmg.us/content/dam/boardleadership/en/pdf/2019/the-esg-journey-lessons-from-the-boardroom-and-c-suite.pdf> [<https://perma.cc/5X7N-44Y7>].

187. *Id.*

188. See Dana Brakman Reiser & Anne Tucker, *Buyer Beware: Variation and Opacity in ESG and ESG Index Funds*, 41 CARDOZO L. REV. 1921, 1927 (2020).

189. *Id.*

190. See Zach Schonfeld, *Vargas Pushes for Broader ESG Disclosure: ‘The Good, the Bad, and the Ugly,’* THE HILL (Dec. 9, 2021, 5:13 PM), <https://thehill.com/policy/finance/585200-vargas-pushes-for-broader-esg-disclosure-the-good-the-bad-the-ugly> [<https://perma.cc/F>].

House of Representatives passed H.R. 1187 (with no Republican votes and all but four Democratic votes),¹⁹¹ and passed and sent the more than eighty-page Corporate Governance Improvement and Investor Protection Act of 2021 (the “Disclosure Act”)¹⁹² to the Senate. In passing the bill, Congress found that the SEC had neither required disclosures of ESG information nor standards for those disclosures.¹⁹³ It found that investors reported that ESG information is material, standardized ESG disclosures are necessary, and voluntary ESG disclosures are inadequate.¹⁹⁴

Although general in nature, the bill has many sections that require new SEC action. For example, the proposed legislation would require the SEC to promulgate ESG metrics and mandate companies to report ESG information to the SEC based upon the uniform metrics.¹⁹⁵ It would also require disclosure of the links between the ESG metrics, long-term business strategy, and the effect of ESG on long-term business.¹⁹⁶ It also gives the SEC the right to incorporate internationally recognized, independent, multi-stakeholder ESG disclosure standards.¹⁹⁷ The bill requires the SEC to create a permanent Sustainability Finance Advisory Committee to advise the Commission on policy changes to facilitate environmentally sustainable investments, and to identify challenges and opportunities associated with sustainable finance.¹⁹⁸ Title IV of the bill is a long section that is completely dedicated to climate change and risk disclosures related to it.¹⁹⁹ The SEC is required to promulgate regulations requiring disclosures on climate change.²⁰⁰ Companies must include disclosure of reporting standards for estimating direct and indirect greenhouse gas emissions; evaluations of the financial impact of, and any risk management strategies related to, climate change; any established corporate governance processes and structures to assess and manage climate related risks; any actions taken to mitigate climate related risks; and specific risk management strategies related to climate

CH6-HPUK].

191. *Id.*

192. *See* Corporate Governance Improvement and Investor Protection Act, H.R. 1187, 117th Cong. (2021).

193. *See id.* § 102.

194. *See id.*; *see also id.* § 103(b)(3) (stating that ESG is de facto material for the purpose of disclosures under the Securities Exchange Act of 1933 and the Securities Act of 1934).

195. *Id.* § 403.

196. *Id.* § 103(a).

197. *Id.* § 103(b)(4).

198. *Id.* § 104.

199. *See id.* § 401–405.

200. *Id.* § 502(a).

risks.²⁰¹ The SEC rules must also require that the companies give quantitative climate change analysis to support any qualitative statements made, and include consideration of the various climate change scenarios utilized in their analysis.²⁰²

Finally, the proposed statute has a very short section that calls for SEC regulation of cybersecurity as part of ESG disclosure.²⁰³ This section simply requires businesses to state whether any member of the board or other governing body has experience or expertise related to cybersecurity.²⁰⁴ If so, they must describe in detail that skillset and/or experience.²⁰⁵ If no member of the governing body has the expertise or qualifications, the business is required to state what steps it is taking to nominate such a person for membership.²⁰⁶

One of the more interesting contrasts relative to the proposed SEC ESG disclosure rules is the Trump-era DOL ruling related to Employment Retirement Income Security Act (ERISA) rules regarding ESG disclosure. This rule became effective in January 2021, and prohibited certain retirement plan fiduciaries from even considering ESG in selecting investments for 401(k) accounts.²⁰⁷ The Financial Factors in Selecting Plan Investments rule specifically requires plan fiduciaries to base their investment decisions exclusively upon financial considerations related to risk-adjusted economic value.²⁰⁸ The rule did not ban ESG considerations, but it had a chilling effect on ESG consideration in investments.²⁰⁹ The Biden-era DOL has proposed a new regulation that states that retirement plan fiduciaries may use climate change and other ESG factors when assessing risks and returns.²¹⁰ One of the comments made by the Trump-era DOL that many would agree with is that the ESG terminology is not a clear or helpful lexicon for regulatory use.²¹¹

Therefore, the first hurdle for the SEC or DOL would be defining ESG. The abbreviation is used to describe a wide array of topics including climate

201. *Id.* § 403.

202. *Id.*

203. *Id.* § 801.

204. *Id.*

205. *Id.*

206. *Id.*

207. Peter J. Miniati, *The Changing Environment for Social Investment*, 69 R.I. BAR J. 7, 8 (2021).

208. *Id.*

209. See Al Barbarino, *DOL Plan Could Make ESG Retirement Investing Hip – Again*, LAW360 (Oct. 15, 2021, 5:47 PM), <https://www.law360.com/articles/1431406> [<https://perma.cc/2P32-B9JN>].

210. *Id.*

211. See Rose, *supra* note 184, at 1826–27 (discussing the ERISA rules and the fuzziness problem with the term ESG).

change, human capital management, human trafficking, supply chain management, human rights, cybersecurity, diversity and inclusion, corporate tax policy, corporate political spending, executive compensation, worker's rights, etc.²¹² Once defined, the problem will be determining uniform ESG metrics. How we measure ESG is almost as important as defining the term. ESG funds often are overweighted with tech stocks and can still carry big polluters, despite having “environmental in their name.”²¹³ Transparent, comprehensive, consistent, easily available, and easily understood ESG metrics are essential for any ESG investor.²¹⁴ The challenge before SEC and DOL is in establishing clear, concise, and comprehensive guidelines establishing baseline ESG metrics and ESG disclosures. ESG metrics and disclosures can help alleviate many of the problems associated with mislabeling and greenwashing. Another challenge that agencies face involves the definition of “materiality.” Historically, the agencies have relied upon a very narrow view regarding what is material to investors. A more expansive definition to include cybersecurity (and corresponding explanation) would allow federal regulators to take into consideration modern global ESG investment trends, and also allow them to consider how various stakeholder concerns can have a dramatic effect upon corporate long-term profits and losses.

C. Informing Consumers

As immature as the disclosure regime is for investors related to ESG guidance, the systems in place for informing consumers about ESG+T information is even more nascent and fractured. This Section reviews label design best practices before moving on to public and private-sector efforts to design ESG+T trustmarks, which is continued globally in Part IV.

1. Label Design: Marketing and Consumer Psychology

Labels are used to “communicate important information to consumers [and users] that is otherwise invisible to them, or difficult to elicit. . . .”²¹⁵

212. *Id.* at 1822 (describing some of the issues covered by ESG and the diverse groups of people and organizations motivated to see ESG regulations come into being).

213. See Holger, *supra* note 123; see also Akane Otani, *ESG Funds Enjoy Record Inflows, Still Back Big Oil and Gas*, WALL ST. J. (Nov. 11, 2019, 4:29 PM), <https://www.wsj.com/articles/top-esg-funds-are-all-still-invested-in-oil-and-gas-companies-11573468200> [<https://perma.cc/DQ3J-EWQ8>].

214. See Satyajit Bose, *Evolution of ESG Reporting Frameworks*, in VALUES AT WORK, *supra* note 114, at 13, 14.

215. JOHN M. BLYTHE & SHANE D. JOHNSON, RAPID EVIDENCE ASSESSMENT ON LABELLING

Pictures are particularly helpful in communicating information to consumers given that “[a] number of studies have shown that pictures are recognized or recalled better than words,” which are helpful “in facilitating the use of mental imagery to remember previously viewed stimuli.”²¹⁶ In general, such pictorial labels may be broken down into at least three distinct categories: descriptive information labels, seal of approval labels, and graded scheme labels, which are briefly introduced in turn.²¹⁷

First, descriptive labels provide information about the product in question, and are generally simple and brief given the “limited cognitive resources” that consumers are able to dedicate to understanding them, such as while shopping.²¹⁸ Seal of approval labels indicate that a given product or device comply with an industry standard, which can be a useful “cognitive shortcut” for consumers who are familiar with such labels, though their binary nature can be misleading.²¹⁹ Graded scheme labels, on the other hand, can be useful while comparison shopping given their use of color codes or letter grades, providing an opportunity for the nuance that is sometimes missed in other schemes.²²⁰

Trustmarks and labeling arise—and should be explored—within the research of “signaling theory,” which is best thought of as a product of information economics.²²¹ Theories evolving from information economics are based on the premise that different parties to a transaction often have different amounts of information regarding transactions, and it is this information asymmetry that has implications for the terms of the transactions and the relationships between parties.²²² In this way, labels—and more narrowly trustmarks²²³—assist consumers in overcoming some of this

SCHMES AND IMPLICATIONS FOR CONSUMER IoT SECURITY 1, 3 (2018), assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/949614/Rapid_evidence_assessment_IoT_security_oct_2018_V2.pdf [https://perma.cc/TST6-385Q].

216. Madhubalan Viswanathan et al., *Understanding the Influence of Literacy on Consumer Memory: The Role of Pictorial Elements*, 19 J. CONSUMER PSYCH. 389, 391 (2009), <https://doi.org/10.1016/j.jcps.2009.04.002>.

217. See BLYTHE & JOHNSON, *supra* note 215, at 3.

218. *Id.* at 12.

219. *Id.*

220. *Id.* at 5.

221. See, e.g., Brian L. Connelly et al., *Signaling Theory: A Review and Assessment*, 37 J. MGMT. 39, 40 (2011), <https://doi.org/10.1177/0149206310388419>.

222. K. Damon Aiken et al., *Building Internet Trust: Signaling Through Trustmarks*, 1 INT’L J. INTERNET MKTG. & ADVERT. 256, 256 (2004).

223. Trustmarks are defined as any third-party mark, logo, picture, or symbol that is presented in an effort to dispel consumers’ concerns about Internet security and privacy and, therefore, to increase firm-specific trust levels. See Kirk Aiken et al., *Developing Internet Consumer Trust: Exploring Trustmarks as Third-Party Signals*, in *MARKETING THEORY AND*

information asymmetry by providing key data necessary for informed decision-making in areas of concern for the community including ESG+T.

A trustmark is designed to communicate trustworthiness through behavioral insinuations of capability, rational suggestions of credibility, and emotional implications of benevolence and integrity.²²⁴ Extended into the IoT context, one would hope that the use of trustmarks would assure consumers that “certified” security, privacy, and disclosure standards exist in the accessed environment.²²⁵ For example, consider the well-known Internet trustmarks of TRUSTe and VeriSign logos. Of course, research exploring the area of trust has been ongoing for considerable time in many different and divergent areas of topics, issues, and collaboration.

In the IoT context, although research concerning trust is still relatively immature, it is evolving. For example, it was posited by Aiken and Boush that “[i]nternet trust as an attitude that has cognitive, affective, and conative (behavioral intention) components. Cognitive and affective elements of trust contain dimensions of credibility (beliefs that the exchange partner can be relied on) and benevolence (beliefs about the exchange partners motivation to seek joint gain).”²²⁶ Follow-up research studies began to examine the necessity of a trustmark as a signal to enhance initial trust such that “[i]nitial trust between parties will not be based on any kind of experience or firsthand knowledge, rather, it will be based on an individual’s disposition to trust or on institutional cues that enable one person to trust another.”²²⁷

These initial studies sought to explore website design and the inferences that can, and are, drawn in the mind of the consumers considering the trustworthiness of the website hosts. It has been considered that some of these prior website design-driven consumer assumptions and decision-driven issues may now be considerations that are necessary to be captured within the trustmark regulatory environment. For example, there are typically three dimensions of initial online trust: (1) affect-based, (2) cognition-based, and

APPLICATIONS 262 (Geraldine R. Henderson & Marian Chapman Moore eds., 2003).

224. *Id.* at 262.

225. K. Damon Aiken & David M. Boush, *Trustmarks, Objective-Source Ratings, and Implied Investments in Advertising: Investigating Online Trust and the Context-Specific Nature of Internet Signals*, 34 J. ACAD. MKTG. SCI. 308, 311 (2006).

226. *Id.* (citing Patricia Doney & Joseph P. Cannon, *An Examination of the Nature of Trust in Buyer-Seller Relationships*, 61 J. MKTG. 35, 35 (1997)).

227. Farhod P. Karimov, Malaika Brengman & Leo Van Hove, *The Effect of Website Design Dimensions on Initial Trust: A Synthesis of the Empirical Literature*, 12 J. ELEC. COM. RSCH. 272, 273 (2011) (quoting D. Harrison McKnight, Larry L. Cummings & Norman L. Chervany, *Initial Trust Formation in New Organizational Relationships*, 23 ACAD. MGMT. REV. 473, 474 (1998)).

(3) institution-based trust.²²⁸ While affect-based trust “develops from one’s instincts, intuition, or feelings concerning whether an individual, group or organization is trustworthy,”²²⁹ cognition-based trust is a consumer’s “rational expectation that an online vendor has the necessary attributes to be reliable,”²³⁰ and institution-based trust occurs when “customers feel something fits a common standard because of the presence of guarantees on the website.”²³¹ As a key aspect of initial trust, the agency or entity granting such a mark has a high responsibility to create and protect the guarantee that exists due to the presence of the trust mark or label.

It is important to note that as early as 2011, studies were being conducted on the use of IPeAs (company policy assurance provided without verification) and EPeAs (security or privacy certificates provided by a third party after substantial testing and careful evaluation of the website). As Karimov, Brengman, and Van Hove argued:

[The] bulk of the literature confirms that institutional structures are important antecedents of online initial trust. Interestingly, internally provided e-assurance structures such as privacy disclosure, security policies and vendor-specific guarantees (return policies, free shipping, and money-back guarantees) can be as effective as paid institutional mechanisms such as third-party trust endorsements.²³²

They went on to note that “IPeAs are more effective than EPeAs,”²³³ and one wonders if an assessment of *both* certificates of privacy/security and assurances of company policy that protects risk and loss to individuals, might be an optimal combination.

In this way, trustmarks and/or labels, and even company policies that provide assurances, can be valuable in many instances, especially in areas such as privacy and security that tend to be a high area of concern for consumers. In situations where any one of these appear as a “guarantee” of compliance with a particular contextual aspect of the website, they should be designed with an eye toward ensuring and protecting trust in both the business’ digital presences *and* the trustmark/label granting institution.²³⁴

228. *Id.*

229. Karimov et al., *supra* note 227, at 273.

230. *Id.* at 274.

231. *Id.*

232. *Id.* at 290.

233. *Id.*

234. *Id.*

2. Environmental Trustmarks

Although there are a wide array of different labels and trustmarks, this subsection explores a subset in the environmental context to introduce the variability and range of options available.

a. Private-Sector Frameworks

Seal of approval labeling is perhaps the oldest, and best established, type of trustmark as may be seen by the Underwriters Laboratories (UL) label, which describes itself as the private-sector “global leader in applied safety science” since helping to assess fire risks to the 1894 World’s Fair.²³⁵ UL published its first safety standard in 1903, and began labeling consumer products in 1906, helping to both inform consumers and motivate firms to innovate and make better products. It has more recently begun rolling out its efforts in the IoT context, as is explored below. Another example is Consumer Reports through its *Digital Standard*, which was launched in 2017 and is designed “to measure the privacy and security of products, apps, and services . . . [to] put consumers in the driver’s seat as the digital marketplace evolves.”²³⁶ These efforts, though, are scattered and require consumers to proactively seek out such information, limiting their utility absent public or broader industry coordination.

b. State-Levels Laws

Some states, such as California, have been particularly active in passing labeling laws, with sixty-five new regulations coming into force in 2021 alone.²³⁷ These labels run the gambit from emissions schemes and safe drinking water protections to requiring “reasonable” IoT security, which

235. *About UL Solutions*, UL SOLUTIONS, <https://www.ul.com/about> [<https://perma.cc/2T9P-3LGX>] (last visited Jan. 24, 2023); *About UL Solutions: History*, UL SOLUTIONS, <https://www.ul.com/about/history> [<https://perma.cc/S6P2-VZ4C>] (last visited Jan. 24, 2023).

236. *Consumer Reports Launches Digital Standard to Safeguard Consumers’ Security and Privacy in Complex Marketplace*, CONSUMER REPS. (Mar. 6, 2017), https://www.consumerreports.org/media-room/press-releases/2017/03/consumer_reports_launches_digital_standard_to_safeguard_consumers_security_and_privacy_in_complex_marketplace/ [<https://perma.cc/2FF8-DCES>].

237. *See California Announces Revised Proposition 65 Labeling & Marketing Regulations*, NAT’L L. REV. (Jan. 20, 2021), <https://www.natlawreview.com/article/california-announces-revised-proposition-65-labeling-marketing-regulations> [<https://perma.cc/BBZ5-4MHQ>].

came into force in 2021.²³⁸ What is “reasonable” in this context is an open question, but in 2016 the California Attorney General defined it in line with the CIS Critical Security Controls, which may be a useful guidepost, but there is provision for the type of data, industry, and size of organization, so the final determination is quite context specific.

c. Federal Regulations

An example of seal of approval labeling is the Energy Star Program, which was developed by the U.S. Environmental Protection Agency (EPA) in 1992 under the Clean Air Act section 103(g).²³⁹ Energy Star standards are set by the EPA under authority granted by the 2005 Energy Policy Act, with the U.S. Department of Energy providing testing procedure in order to certify products, such as appliances, in order for them to bear the Energy Star label.²⁴⁰ The rating scheme is regularly updated and has been deemed widely successful over nearly thirty years, helping “American families and businesses save 5 trillion kilowatt-hours of electricity, avoid more than \$500 billion in energy costs, and achieve 4 billion metric tons of greenhouse gas reductions.”²⁴¹ It has also been shown to be an efficient use of taxpayer money to promote energy efficiency, with every dollar spent by the EPA resulting in \$350 in energy costs savings for American families and organizations.²⁴²

Similarly, Food and Nutrition Labels are a combination of Descriptive and Seal of Approval Labels, given the wide array of nutritional information in play. Indeed, given the breadth of dietary considerations in food labeling, they may come closest to rivaling the cybersecurity and privacy issues and challenges facing consumers. Food labeling in the United States dates back to the death of U.S. President Zachary Taylor, who reportedly passed away due to a food-born illness, prompting President Abraham Lincoln to create

238. See, e.g., *Decoding “Reasonableness” Under California’s IoT Law*, DENTONS (Apr. 7, 2021), <https://www.dentons.com/en/insights/articles/2021/april/7/decoding-reasonableness-under-californias-iot-law> [<https://perma.cc/Z2FY-H3BP>].

239. *Statutory Authority for ENERGY STAR*, ENERGY STAR, www.energystar.gov/about/origins_mission/epas_role_energy_star/epa's_statutory_authority_energy_star [<https://perma.cc/QW48-EVAS>] (last visited Jan. 22, 2022).

240. See *id.*; *EPA’s Role in ENERGY STAR*, ENERGY STAR, www.energystar.gov/about/origins_mission/epas_role_energy_star [<https://perma.cc/D737-W2N2>] (last visited Jan. 22, 2022).

241. *What is ENERGY STAR*, ENERGY STAR, www.energystar.gov/about [<https://perma.cc/J828-M3BP>] (last visited Jan. 22, 2022); see also *Statutory Authority for ENERGY STAR*, *supra* note 239.

242. *What is ENERGY STAR*, *supra* note 241.

the U.S. Department of Agriculture in 1862.²⁴³ Yet it took another century for the USDA to mandate nutritional labeling on food products, such as when it required a list of ingredients to be displayed on consumer food packages in 1966.²⁴⁴ The use of such labels has broadened substantially over the years, comprising a “soft” method to educate consumers on healthy eating habits and even broader ESG information.²⁴⁵ Such labels, including organic food trustmarks, have begun to move the needle, as reflected by a USDA study finding that a majority of adults utilized various nutritional labels when making purchases.²⁴⁶ The idea of a “healthy” IoT device exhibiting a certain standard of ESG+T benchmarks, though, remains on the drawing board, though more progress has been made on technology trustmarks.

3. Technology Trustmarks

Labeling IoT devices to meaningfully convey cybersecurity and data privacy information to consumers is no easy feat, as may be seen in the environmental context discussed in Section III.A. Accurate labeling is an invaluable tool to both empower consumers and protect firms.

a. Private-Sector Frameworks

The UL has rolled out both Seal of Approval Labels and Graded Scheme Labels in the IoT context through its UL IoT Security Rating, with the latter consisting of five levels: diamond, platinum, gold, silver, and bronze, as shown below in Figure 2.²⁴⁷ This scheme, in turn, is based on a forty-four-requirement certification process, with requirements ranging from software updates and protocol security, to encrypted personally identifiable

243. *Factual Food Labels: A Closer Look at the History*, UNIV. TEX. AUSTIN: SCH. OF HUM. ECOLOGY (Apr. 6, 2018), he.utexas.edu/ntr-news-list/food-labels-history [<https://perma.cc/Z9LE-TRQ2>].

244. *Id.*

245. Dariush Mozaffarian & Siyi Shangguan, *Do Food and Menu Nutrition Labels Influence Consumer or Industry Behavior?*, STAT (Feb. 19, 2019), <https://www.statnews.com/2019/02/19/food-menu-nutrition-labels-influence-behavior/> [<https://perma.cc/EEG4-6PEP>].

246. See ELISE GOLAN, FRED KUCHLER & LORRAINE MITCHELL, U.S. DEP’T OF AGRIC., AGRIC. ECON. REP. NO. 793. ECONOMICS OF FOOD LABELING 21 (U.S.D.A. 2000), www.ers.usda.gov/webdocs/publications/41203/18885_aer793.pdf [<https://perma.cc/5RVZ-4T85>] (“Results from USDA’s Diet and Health Knowledge Survey . . . indicate that 65 percent of adults use the nutrition label . . .”).

247. *IoT Security Rating Levels Guide*, UL SOLUTIONS, <https://www.ul.com/resources/lot-security-rating-levels-guide> [<https://perma.cc/KS23-GJX8>] (last visited Nov. 10, 2022).

information.²⁴⁸



Figure 2. UL IoT Security Ratings Label²⁴⁹

Uptake of the UL IoT Labels, though, has remained limited, prompting considerations of ways to leverage the federal government to promote their continued refinement and use.

b. Cyberspace Solarium Commission

The Cyberspace Solarium Commission (CSC)—modeled after the Cold War-era Project Solarium that was designed to catalyze a U.S. strategy to contain the Soviet Union²⁵⁰—was established by the John S. McCain National Defense Authorization Act for Fiscal Year 2019 to “develop a consensus on a strategic approach to defending the United States in cyberspace against cyber-attacks of significant consequences.”²⁵¹ The CSC

248. Pardis Emami-Naeini et al., *Ask the Experts: What Should Be on an IoT Privacy and Security Label?*, in 2020 IEEE SYMPOSIUM ON SECURITY AND PRIVACY, 447, 459 (2020), <https://doi.org/10.1109/SP40000.2020.00043>.

249. See *UL Verified IoT Device Security Rating*, UL SOLUTIONS, <https://www.ul.com/services/ul-verified-iot-device-security-rating> [<https://perma.cc/KS23-GJX8>] (last visited Nov. 10, 2022).

250. See Joshua Rovner, *Did the Cyberspace Solarium Commission Live Up to Its Name?*, WAR ON THE ROCKS (Mar. 19, 2020), <https://warontherocks.com/2020/03/did-the-cyberspace-solarium-commission-live-up-to-its-name/> [<https://perma.cc/N65F-Z9P6>].

251. U.S. CYBERSPACE SOLARIUM COMM’N, 2021 ANNUAL REPORT ON IMPLEMENTATION 4 (2021), <https://cybersolarium.org/wp-content/uploads/2022/05/2021-Annual-Report-on-Implementation.pdf> [<https://perma.cc/JU9P-ANMG>].

was co-chaired by Senators Angus King and Mike Gallagher, and released its final report on March 11, 2020, which included eighty-two recommendations to strengthen U.S. cyber deterrence through defense-in-depth.²⁵² By the end of 2020, at least twenty-five of these recommendations had been codified.²⁵³ As of 2021, approximately 35% of the recommendations had been actually or nearly implemented with roughly another 44% being on track toward implementation, leaving approximately 20% of the recommendations facing barriers to realization.²⁵⁴ Among those recommendations is the proposal to establish a National Cybersecurity Certification and Labeling Authority (“Labeling Authority”), as is discussed below.²⁵⁵

In particular, the CSC called upon Congress to enact legislation that would empower the U.S. Department of Commerce, in collaboration with the Department of Homeland Security (DHS) and the Department of Defense (DoD), to craft a nonprofit, nongovernmental organization to establish the Labeling Authority.²⁵⁶ The notion is that this institution would establish a voluntary cybersecurity certification and labeling program, in which enforcement for false and misleading labels would be done by the Federal Trade Commission (FTC).²⁵⁷ The Labeling Authority would focus on product certification and attestation, certifying agents, security scoring, fostering partnerships, and updating government procurement to ensure that secure products are purchased within five years.²⁵⁸ In this way, the proposed Labeling Authority is similar to the “Cyber Shield Act” proposed in 2017 and 2019, which would establish cybersecurity benchmarks and create a shield trustmark for consumer IoT devices.²⁵⁹ As of this writing, though, the Act has not received a vote in the House or Senate.

c. Executive Orders

The Biden Administration has been active in using its authority to make

252. See *id.* at 2; see also *About*, U.S. CYBERSPACE SOLARIUM COMM’N, <https://www.solarium.gov/about> [<https://perma.cc/6L45-U9AH>] (last visited Jan. 22, 2022).

253. See *About*, *supra* note 252.

254. See U.S. CYBERSPACE SOLARIUM COMM’N, *supra* note 251, at 2.

255. *Id.* at 6.

256. *Id.* at 28.

257. *Id.* at 42.

258. *Id.* at 28–30, 42.

259. Micaela McMurrough & Jayne Ponder, “*Cyber Shield Act*” *Calling for IoT Device Certification Reintroduced in Congress*, COVINGTON: INSIDE PRIVACY (Mar. 26, 2021), <https://www.insideprivacy.com/cybersecurity-2/cyber-shield-act-calling-for-iot-device-certification-reintroduced-in-congress/> [<https://perma.cc/QMJ6-ZPF9>].

progress on addressing the nation’s cybersecurity vulnerabilities through executive orders, particularly Executive Order 14028 released on May 12, 2021.²⁶⁰ In section 4, among other provisions, the Order called the National Institute for Standards and Technology (NIST) to “initiate pilot programs informed by existing consumer product labeling programs to educate the public on the security capabilities” of IoT devices.²⁶¹ By Spring 2022, NIST and the FTC are to identify IoT security labeling criteria potentially modeled on existing laws and programs, including EnergyStar.²⁶² A similar effort is underway for consumer software labeling, potentially including a “tiered software security rating system.”²⁶³

On November 1, 2021, NIST announced a draft set of criteria for consumer software security that are designed “to aid in the development and voluntary use of labels to indicate that the software incorporates a baseline level of security measures.”²⁶⁴ After the public comment period, NIST will be releasing a final version by February 6, 2022.²⁶⁵ In creating the draft criteria, NIST grappled with a number of challenging issues, including the “sheer vastness and variety of the consumer software landscape,” and called for any resulting labels to be voluntary with “attestations” as to the software’s security, data inventory, and capabilities.²⁶⁶ This process will be informed by how other jurisdictions have grappled with similar labeling challenges, including the United Kingdom, European Union, and Singapore explored in Part IV.

IV. COMPARATIVE CASE STUDIES

This Part compares and contrasts how a diverse array of jurisdictions in North America, Europe, and Asia have approached ESG+T IoT labeling and trustmarks to date in an effort to identify areas of convergence, divergence, and governance gaps.

260. Executive Order 14028 of May 12, 2021 Improving the Nation’s Cybersecurity, 86 Fed. Reg. 26633 (May 17, 2021).

261. *Id.* at § 4(s), at 26640.

262. *Id.* at § 4(t), at 26640.

263. *Id.* at § 4(u), at 26640–41.

264. *NIST Seeks Public Input on Consumer Software Labeling for Cybersecurity*, NAT’L INST. OF STANDARDS & TECH. (Nov. 1, 2021), <https://www.nist.gov/news-events/news/2021/11/nist-seeks-public-input-consumer-software-labeling-cybersecurity> [<https://perma.cc/8L6S-PYCU>].

265. *Id.*

266. *Id.*

A. United Kingdom

The United Kingdom has long been a global leader in developing cybersecurity standards and frameworks, including its Cyber Essentials Plus Certification.²⁶⁷ This is also true in the cybersecurity trustmark context, in particular, as seen in the Department for Digital, Culture, Media & Sport (DCMS) publication of its *Code of Practice for Consumer IoT Security* in 2018.²⁶⁸ These guidelines were the result of a stakeholder process similar to the NIST approach, which, in the U.K., was organized by its National Cyber Security Centre.²⁶⁹ The end goal was to reinforce a security-by-design culture throughout the IoT product lifecycle to help consumers “stay secure in a digital world” and guard against DDoS attacks, similar to the Marai botnet experienced by Dyn.²⁷⁰

In early 2020, the U.K. built on this foundation with a plan to require IoT cybersecurity standards for all Internet-connected products.²⁷¹ Among other things, IoT device manufacturers are required to state for how long devices will receive security updates at the time of sale.²⁷² Moreover, the U.K. government has recognized the need for quickly being able to amend security requirements through secondary legislation to ensure that they are kept up to date with changing technology.²⁷³ Finally, in April 2021, the U.K. released a white paper that is designed to mandate its 2018 “Secure by Design Code of Practice” beginning with: (1) banning universal default passwords, (2) implementing a mechanism for reporting vulnerabilities, and (3) providing transparency for how long updates will be received.²⁷⁴

The U.K. also continues to follow the EU’s General Data Protection Regulation (GDPR), which it codified into its domestic law prior to Brexit.²⁷⁵

267. See *Cyber Essentials: About Cyber Essentials*, NAT’L CYBER SEC. CTR., <https://www.ncsc.gov.uk/cyberessentials/overview> [<https://perma.cc/MY3R-43M9>] (last visited Jan. 22, 2022).

268. DEP’T FOR DIGIT., CULTURE, MEDIA & SPORT, *CODE OF PRACTICE FOR CONSUMER IoT SECURITY 1* (2018), <https://www.gov.uk/government/publications/code-of-practice-for-consumer-iot-security> [<https://perma.cc/P7VU-XT46>].

269. *Id.* at 1, 3–4.

270. *Id.* at 1–2; see also *supra* note 106 and accompanying text.

271. Matt Warman, *Proposals for Regulating Consumer Smart Product Cyber Security – Call for Views* (Oct. 1, 2020), <https://www.gov.uk/government/publications/proposals-for-regulating-consumer-smart-product-cyber-security-call-for-views/proposals-for-regulating-consumer-smart-product-cyber-security-call-for-views>.

272. See DEP’T DIGIT., CULTURE, MEDIA & SPORT, *supra* note 268.

273. *Id.*

274. *Id.*

275. See INFO. COMM’R’S OFF., *GUIDE TO THE GENERAL DATA PROTECTION REGULATION (GDPR)* (2018), <https://ico.org.uk/media/for-organisations/guide-to-the-general-data-protect>

As seen in the U.S. context with stepped-up SEC scrutiny, the U.K. and EU Member States under GDPR are similarly forcing covered firms to reveal the extent of cyber-attacks, often within the seventy-two data breach notification window established by GDPR.²⁷⁶ There has not yet been an effort in the U.K. to combine environmental and technology trustmarks into ESG+T information for consumers.

B. European Union

As in the United States, there are a wide array of public and private sector groups attempting to create IoT labels and trustmarks across the EU. These efforts include the European Commission itself, which aims to establish a certification framework for Information and Communication Technologies (ICT) to empower and inform consumers and increase transparency across the EU.²⁷⁷ In addition, the European Union Agency for Cybersecurity (ENISA) is empowered through the EU Cybersecurity Act to ensure that labels are consistently applied and that each certification appropriately identifies the type of product or service covered, the technical cybersecurity requirements, evaluation criteria used, and the level of assurance.²⁷⁸ The breadth of this scheme stands apart from other national approaches, including Singapore, given that it is broader than IoT—encompassing ICT.

Approaches to the EU's IoT trustmarks remain fragmented despite these efforts with the European Telecommunications Standards Institute (ETSI) and the European Cyber Security Organization (ECSO) continuing to operate their own cybersecurity certification schemes.²⁷⁹ ETSI, in particular, aims at promoting the manufacture and use of sustainable, secure technologies including IoT, such as the ETSI IoT standard (EN 303 645),

ion-regulation-gdpr-1-0.pdf.

276. Owen Walker, *GDPR to Force Fund Companies to Reveal Extent of Cyber Attacks*, FIN. TIMES (May 26, 2018), <https://www.ft.com/content/0bc03278-5e96-11e8-9334-2218e7146b04> [<https://perma.cc/U7Z4-MB6K>].

277. *Proposal for a Regulation of the European Parliament and of the Council on ENISA, the "EU Cybersecurity Agency", and Repealing Regulation (EU) 526/2013, and on Information and Communication Technology Cybersecurity Certification ("Cybersecurity Act")*, COM (2017) 477 final (Sept. 13, 2017).

278. *The EU Cybersecurity Certification Framework*, EUR. COMM'N, digital-strategy.ec.europa.eu/en/policies/cybersecurity-certification-framework [<https://perma.cc/RA74-XNAC>] (last visited July 1, 2021).

279. Sophia Antipolis, *ETSI Releases World-Leading Consumer IoT Sec. Standard*, ETSI (June 30, 2020), www.etsi.org/newsroom/press-releases/1789-2020-06-etsi-releases-world-leading-consumer-iotsecurity-Standard [<https://perma.cc/A9PL-PNU2>].

which is a foundation for certifying and labeling consumer IoT devices.²⁸⁰ This ETSI IoT standard comprises 13 recommendations to standardize IoT device security and privacy across the European Single Market, as seen below in Figure 3.

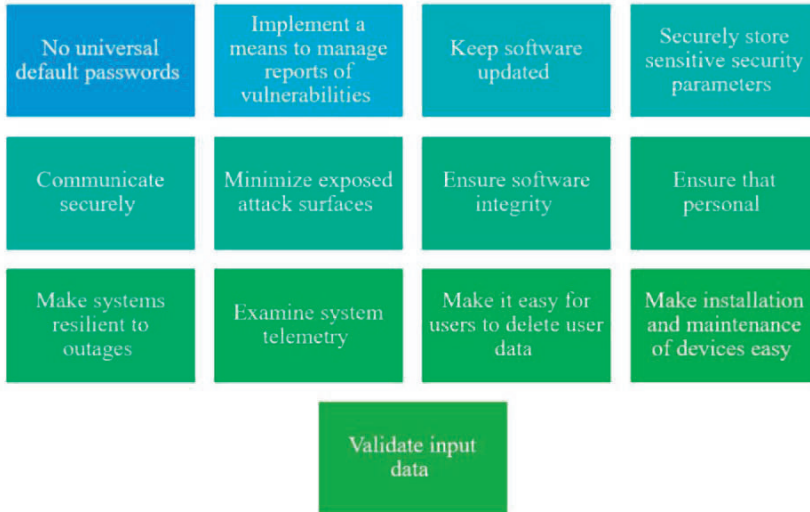


Figure 3. ETSI EN 303 645 Provisions²⁸¹

ECSO, on the other hand, partners with public and private-sector stakeholders to produce IoT device labels and has spearheaded a program called Cybersecurity Made in Europe.²⁸² Beyond empowering consumers, ECSO also hopes that its efforts benefit producers that take cybersecurity seriously, enabling them to use it as a differentiator from their competitors.²⁸³ As of this writing, it remains to be seen how effective such efforts will be EU-wide, though some European nations—such as Finland—are already going further, including by introducing cybersecurity certificates from the Finnish Transport and Communication Agency (Traficom) for IoT devices to guarantee “to consumers that the labelled devices have basic information

280. *Id.*

281. EUR. TELECOMMS. STANDARDS INST., EN 303 645, CYBER; CYBER SEC. FOR CONSUMER INTERNET OF THINGS: BASELINE REQUIREMENTS (2020), https://www.etsi.org/deliver/etsi_en/303600_303699/303645/02.01.01_60/en_303645v020101p.pdf [<https://perma.cc/2GVW-NW8T>].

282. CYBERSECURITY MADE IN EUROPE, <https://www.cybersecurity-label.eu/> [<https://perma.cc/EMW5-YPAM>] (last visited Jan. 24, 2023).

283. *Id.*

security features.”²⁸⁴ These features are based, in turn, on the EN 303 645 from Figure 3, and were designed with a global audience in mind in hopes that they will gain traction around the world, including in Asia.

C. Singapore

The Asian nation arguably furthest along in developing IoT trustmarks is Singapore, which in 2020 became the first Asia-Pacific nation to introduce an IoT labeling scheme.²⁸⁵ In particular, the Cyber Security Agency (CSA) of Singapore implemented its Cybersecurity Labelling Scheme (CLS) with a goal of benefiting both consumers and manufacturers, similar to Finland’s vision.²⁸⁶ Although the CLS was originally focused on a subset of consumer IoT devices such as routers and smart home hubs, it was later expanded to encompass all of IoT, though not as broad as ICT that was shown with the ENISA approach.

The heart of the CLS approach is a rating system to improve transparency that features a range of one to four stars, as is shown below in Figures 4 and 5. Simply put, the more stars that a device boasts, the more secure it is purported to be against a range of common cyber-attacks.²⁸⁷



Figure 4. Singapore CLS Cybersecurity Labels²⁸⁸

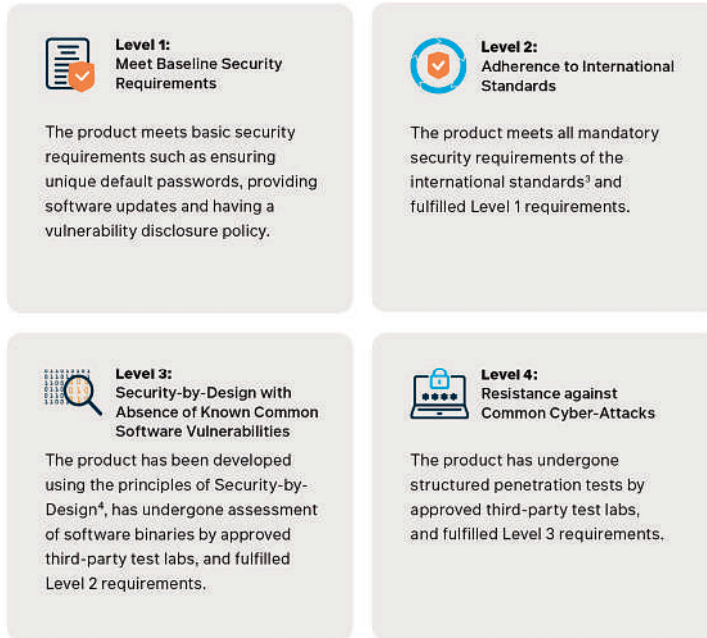
284. *Traficom’s Cybersecurity Label Helps Consumers Identify Devices That Are Sufficiently Secure*, HELP NET SEC. (Nov. 28, 2019), <https://www.helpnetsecurity.com/2019/11/28/traficom-cybersecurity-label/> [<https://perma.cc/S3AY-VCL4>].

285. Silviu Stahie, *Sing. to Enforce Cybersecurity Labelling Scheme for IoT Devices*, BITDEFENDER (Oct. 19, 2020), <https://www.bitdefender.com/blog/hotforsecurity/singapore-enforce-cybersecurity-labelling-scheme-iot-devices> [<https://perma.cc/B9PF-R7Z4>].

286. *Id.*; see *supra* Section IV.B.

287. CYBER SEC. AGENCY OF SING., *CYBERSECURITY CERTIFICATION GUIDE 6–7* (2021), <https://www.csa.gov.sg/-/media/Csa/Documents/CLS/CSA-Cybersecurity-Certification-in-Brief.pdf> [<https://perma.cc/2CHZ-P89G>].

288. *Cybersecurity Labelling Scheme (CLS) for Consumers*, CYBER SEC. AGENCY OF SING., <https://www.csa.gov.sg/Programmes/certification-and-labelling-schemes/cybersecurity-labelling-scheme/for-consumers> [<https://perma.cc/A8LK-FBMH>] (Oct. 28, 2022).



³ Cyber Security for Consumer Internet of Things, ETSI EN 303 645.

⁴ IMDA IoT Cyber Security Guide, March 2020. The guide seeks to provide baseline recommendations and foundational concepts for IoT.

Figure 5. CSA Cybersecurity Tiers²⁸⁹

However, it is worth noting that these labels are voluntary, although to encourage their uptake, CSA waived all CLS application fees through 2021.²⁹⁰

Requirements for rules mandating disclosure of cybersecurity risks and practices to investors in Singapore are evolving, but the government has released a guide on managing and notifying impacted stakeholders about cyber threats.²⁹¹ In general, though, if a firm wishes to list on an exchange in Singapore, it should disclose if it is exposed to cybersecurity risks, “as well as where cybersecurity incidents ha[ve] happened in the past which impacted the company.”²⁹²

289. CYBER SEC. AGENCY OF SING., *supra* note 287, at 7.

290. *See* Stahie, *supra* note 285.

291. *See Guide on Managing and Notifying Data Breaches Under the PDPA*, PERS. DATA PROT. COMM’N SING., <https://www.pdpc.gov.sg/help-and-resources/2021/01/data-breach-management-guide> [<https://perma.cc/C4HK-GXDJ>] (Sept. 13, 2022).

292. MARCUS CHOW, JOLIE GIOUW & ADELINE GOH, BIRD & BIRD, CYBERSECURITY &

D. Summary

Both Parts III and IV have demonstrated the variety of approaches being attempted around the world to educate consumers and investors, and encourage manufactures, to be more informed and transparent in their ESG+T decision-making. Several common threads have emerged, including the desirability of a tiered approach with simple-to-understand emblems, incentives for manufacturers to encourage uptake, and flexibility to ensure that security and privacy metrics can be easily updated with changing technology. We next delve further into these policy implications.

V. POLICY IMPLICATIONS

As this Article has explored, transparency for both investors and consumers is key to helping them make informed—and responsible—choices about their investments, and purchases, both in the IoT context and more broadly. As both the importance and meaning of ESG has expanded over the years to now include technology, and cybersecurity in particular, we feel that a two-pronged approach is needed to leverage and refine the trustmarks and other tools described above.

First, as was shown in Part III, clarity on ESG reporting is needed for investors, particularly with regard to the definition of “materiality” insofar as it now combines both climate and cybersecurity components.²⁹³ The Biden Administration could issue an executive order requiring the SEC and Labor Departments to coordinate, potentially in collaboration with NIST, on developing baseline ESG metrics, and from there, ESG+T disclosure requirements.

Second, we feel that the time is ripe for Congress to act on the CSC’s recommendation to task the Department of Commerce, the DHS, and the DoD with crafting a nonprofit, nongovernmental cyber security trustmarks labeling authority. The efforts of this authority should be informed by the ESG+T guidance for investors being developed by the SEC and Department of Labor and should learn from the experiments in both Europe and Asia

SINGAPORE – DISCLOSURES FOR LISTED COMPANIES 1 (2019), <https://www.twobirds.com/-/media/pdfs/singapore/2019/cybersecurity-and-singapore-june-2019.pdf> [<https://perma.cc/5S7A-2NNW>].

293. There are growing demands among employees for purposeful work driven by ESG as well. *See, e.g.*, Sean Brown & Robin Nuttall, *The Role of ESG and Purpose*, MCKINSEY & Co. (Jan. 4, 2022), <https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/the-role-of-esg-and-purpose> [<https://perma.cc/26GJ-JXJH>] (exploring the evolution and importance of ESG).

discussed in Part IV. In particular, the authority should coordinate with both the EU and Singapore to ensure commonality of labels across jurisdictions while leveraging signaling theory where possible, such as by incorporating, EN 303 645, EG 203 251, Common Vulnerability Scoring System, the CIS Critical Security Controls, the UL's IoT security efforts, and the U.K.'s Security by Design Code of Practice, in fashioning tiered cybersecurity trustmarks. As in Singapore, the labels could be voluntary, but the U.S. government could waive application fees and invest in consumer education as part of Cybersecurity Awareness Month to encourage their uptake.

No single labeling scheme is able to communicate the full range of ESG+T information that is increasingly being demanded by consumers, employees, and investors. Moreover, as the only constant is change, with regard to both technology and regulation, any such regime should be easily amended and updated. Given the breadth of IoT devices, it could also make sense to begin with a class of devices as in Singapore, such as smart speakers, Internet-connected security cameras, and doorbells, given the privacy and public safety interests at stake.²⁹⁴ Through security and risk assessments and security testing,²⁹⁵ layered visual labels could be developed to ensure that both lay and sophisticated consumers would have a wealth of ESG+T information at their fingertips. An example of such an approach is offered below in Figure 6.

294. See, e.g., Kari Paul, *Dozens Sue Amazon's Ring After Camera Hack Leads to Threats and Racial Slurs*, *THE GUARDIAN* (Dec. 23, 2020, 4:40 PM), <https://www.theguardian.com/technology/2020/dec/23/amazon-ring-camera-hack-lawsuit-threats> [<https://perma.cc/N9PR-ADHN>].

295. See Bjorn Regnell, Per Runeson & Claes Wohlin, *Towards Integration of Use Case Modelling and Usage-Based Testing*, 50 *J. SOFTWARE & SYS.* 117, 118 (2000), [https://doi.org/10.1016/S0164-1212\(99\)00084-9](https://doi.org/10.1016/S0164-1212(99)00084-9).

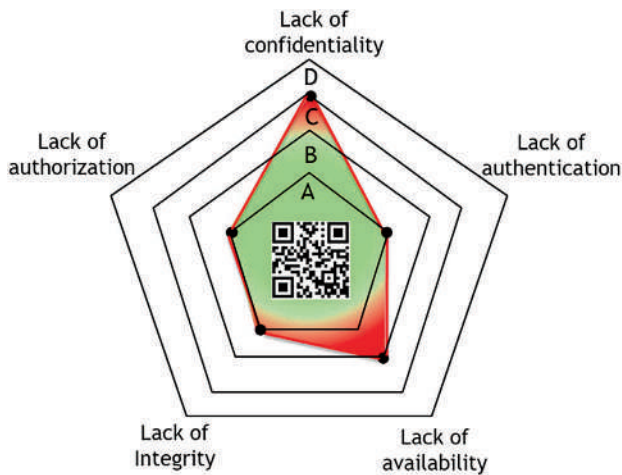


Figure 6. Multidimensional Cybersecurity Label²⁹⁶

Such a multidimensional label would be capable of displaying various ESG+T metrics that could be tailored depending on the context of the device, and jurisdiction in which it is sold. One could imagine a version of Figure 6 coupled with a simple, potentially tiered labeling scheme that would not only reference traditional data confidentiality, integrity, and availability (CIA) information, but also broader ESG concerns.

CONCLUSION

This Article has made the case that even as both investors and consumers are demanding ESG+T information to guide their investments and spending, a lack of clarity and rigor has held back the field even as the environmental, reputational, and financial costs of the tech sector continue to mount. An all-of-the-above approach to addressing these governance gaps has been suggested, which in the U.S. context would include, at a minimum, coordination between the SEC, DOL, DHS, DoD, and NIST to develop ESG+T metrics, and action from Congress to establish a trustmarks labeling authority, as recommended by the CSC. Absent such steps, industry could collaborate with established schemes in the EU and Singapore, building from civil society efforts.

Sustainability generally, and ESG specifically, are lodestars for the

296. Sara N. Matheu-Garcia et al., *Risk-Based Automated Assessment and Testing for the Cybersecurity Certification and Labelling of IoT Devices*, 62 *COMPUT. STANDARDS & INTERFACES* 64, 81 fig.13 (2019), <https://doi.org/10.1016/j.csi.2018.08.003>.

twenty-first century. Yet to date, environmental and technology disclosure and labeling schemes have remained separate. This is short-sighted and counterproductive given the rich crossover between these fields. As Carson said in *Silent Spring*:

We stand now where two roads diverge. But unlike the roads in Robert Frost's familiar poem, they are not equally fair. The road we have long been traveling is deceptively easy, a smooth superhighway on which we progress with great speed, but at its end lies disaster. The other fork of the road—the one less travelled by—offers our last, our only chance to reach a destination that assures the preservation of the earth.²⁹⁷

Technology can and should be added to this concept to ensure that we take the road perhaps less traveled, but one that leads to a more sustainable—and secure—future.

297. RACHEL CARSON, *SILENT SPRING* 277 (1962).