FRICTION-IN-DESIGN REGULATION AS 21ST CENTURY TIME, PLACE, AND MANNER RESTRICTION[*]

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Digital networked society needs friction-in-design regulation that targets the digital architectures, supposedly smart (data-driven, algorithmic) systems, and interfaces that shape human interactions, behavior, and will (beliefs, preferences, values, intentions). The relentless push to eliminate friction for the sake of efficiency has hidden social costs that affect basic human capabilities and society. A general course correction is needed.

Friction in the digital networked environment can come in many forms. It can be as simple as a time delay prior to publishing a social media post, a notice that provides salient information coupled with a nudge toward actual deliberation, or a query that tests comprehension about important consequences that flow from an action–for example, when clicking a virtual button manifests consent to share information with strangers. We explore many examples using a simple descriptive framework that helps analysts compare and evaluate them.

One major obstacle in the United States to almost any regulation of how private companies design digital networked technologies and govern social interactions online is the First Amendment and its rigorous protections for free speech. The First Amendment has so often been used to strike down government regulation of various forms of speech that it now has a powerful preemptive effect, which some have called First Amendment Lochnerism. We are most concerned with the foreclosure of regulatory imagination and thus

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consideration and exploration of new regulatory possibilities, such as friction-in-design regulation.

In this article, we clear the First Amendment brush and reveal an open and mostly underappreciated regulatory territory to explore. We argue that friction-in-design regulation should be understood as Twenty-First century time, place, and manner restrictions, akin to laws that prohibit using megaphones in the middle of the night, require permits before marches, and prohibit adult theaters in residential neighborhoods. This does not mean that friction-in-design regulation would escape First Amendment scrutiny altogether, of course. But it would trigger intermediate rather than strict scrutiny, so long as the friction-in-design regulation remained content neutral. In other words, not all friction-in-design regulations would qualify as content neutral time, place, and manner restrictions. We discuss various examples.

At the same time, we advance a novel governance theory that casts time, place, and manner restrictions as a useful regulatory model to bring online from the offline context and conventional First Amendment jurisprudence. Properly understood, designed and applied, time, place, and manner restrictions constitute a system for balancing individual freedom to communicate with the collective (state) interest in maintaining social order and peace, both offline and online.

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INTRODUCTION

Digital networked society needs *friction-in-design*[1] regulation that targets the digital architectures, supposedly smart (data-driven, algorithmic) systems, and interfaces that shape human interactions and behavior.[2] The relentless push to eliminate friction in the digital networked environment for the sake of efficiency has hidden significant social costs that affect basic human capabilities and society.[3] A general course-correction is needed.

Friction-in-design, which induces humans to behave more safely and civilly in many offline contexts, can come in many forms online.[4] It can be as simple as a time delay prior to publishing a social media post, a notice that provides salient information coupled with a nudge toward actual deliberation, or a query that tests comprehension about important consequences that flow from an action—for example, when clicking a virtual button manifests consent to share information with strangers. We explore many examples using a simple descriptive framework that helps analysts compare and evaluate them.[5]

One major obstacle in the United States[6] to almost any regulation of how private companies design digital networked technologies and govern social interactions online is the First Amendment of the U.S. Constitution and its rigorous protections for speech.[7] The First Amendment has so often been used to strike down government regulation of various forms of speech that it now has a powerful preemptive effect against even proposing better ways of governing online activity, which some have called First Amendment

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[1] Paul Ohm convinced us that friction-by-design, the term one of us (Frischmann) used previously, was likely to be confusing because of the way that people understand existing concepts like privacy-by-design and security-by-design. In those formulations, privacy and security are Ends to which design serves as a Means. We do not, however, hold friction to be an End worth pursuing. Rather, friction is instrumental, and in fact an important contribution of this Article is to propose a descriptive framework for evaluating and comparing how different frictional measures can be instrumental. Thus, since we are focused on frictional design measures that introduce one or more types of friction, we opted for the more descriptive label: *friction-in-design*.

[2] *See* Brett Frischmann, Evan Selinger, RE-ENGINEERING HUMANITY (2018).

[3] *Id. See infra* Part I.

[4] *See infra* Parts II and IV.

[5] *See infra* Parts II and IV.

[6] In this Article we focus on the United States because its Constitution's First Amendment has long been seen as an obstacle to regulation. We are well aware that the vast majority of platforms' users are elsewhere in the world, and that there are many opportunities for friction-in-design regulation outside the United States.

[7] *See infra* Part III.

Lochnerism.[8] We are most concerned with the foreclosure of regulatory imagination and thus consideration and exploration of new regulatory possibilities,[9] such as friction-in-design regulation.[10]

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[8] The term refers to the now-reviled U.S. Supreme Court case of Lochner v. New York 196 U.S. 45 (1905) in which the Court relied on freedom of contract to overturn a New York state law forbidding bakeries from obliging their employees to work more than 10 hours a day or 60 hours a week. There is extensive literature on what is now called First Amendment Lochnerism. *See, e.g.*, Robert Post, *Meiklejohn's Mistake: Individual Autonomy and the Reform of Public Discourse*, 15 U. COLO. L. REV. 1090 (1993)**;** J.K. Kessler, *The Early Years of First Amendment Lochnerism*, 116 COLUM. L. REV. 1915 (2016); William French, *This Isn't Lochner, It's The First Amendment: Reorienting the Right to Contract and Commercial Speech*, 114 NW. U. L. REV. 469 (2019); Sam Lebovic, *The Conservative Press and the Interwar Origins of First Amendment Lochnerism*, 39 L. & HIST. REV. 539, 567 (2021); James Y. Stern, *First Amendment Lochnerism & The Origins of the Incorporation Doctrine*, 2020 U. OF ILL. L. REV. 1501, 1540; Genevieve Lakier, *The First Amendment's Real Lochner Problem*, 87 U. CHI. L. REV. 1241 (2020)**;** Enrique Armijo, *Faint-Hearted First Amendment Lochnerism*, 2020 BOS. U. L. REV. 1; Charlotte Garden, *The Deregulatory First Amendment at Work,* 51 HARV. C.R. -C.L. L. REV. 323 (2016)*;* Erica Goldberg, *First Amendment Cynicism andRedemption*, 88 U. CIN. L. REV. 959 (2020)**;** Howard M. Wasserman, *Bartnicki as Lochner: Some Thoughts on First Amendment Lochnerism*, 33 N. KY. L. REV. 421 (2006); Rachel Proctor May, *Punitive Preemption and The First Amendment*, 55 SAN DIEGO L. REV. 1 (2018); Alan Z. Rozenshtein, *Silicon Valley's Speech: Technology Giants and the Deregulatory First Amendment*, 2021 J. OF FREE SPEECH L. REV. 337. In the context of content moderation, for example, Kyle Langvardt has emphasized the absurdity of "the First Amendment's free speech guarantee becom[ing] a mandate for a small number of corporate heads to rule public discourse."Kyle Langvardt, *Platform Speech Governance and the First Amendment: A User-Centered Approach*, LAWFARE'S DIGITAL SOCIAL CONTRACT PAPER SERIES (November 1, 2020), https://ssrn.com/abstract=3893881[https://perma.cc/9KKC-K8FF]; We agree with Langvardt that the First Amendment should not bar public oversight of private governance.

[9] *See* Amanda Shanor, *The New Lochner*, 2016 WIS. L. REV. 133 (First Amendment Lochnerism is a form of constitutional deregulation that places strict boundaries on conceivable regulation); Alan Z. Rozenshtein, *Silicon Valley's Speech: Technology Giants and the Deregulatory First Amendment,* 1 JOURNAL OF FREE SPEECH LAW 337, 343 (2021)("More generally, as Jedediah Purdy observes, the fact that First Amendment arguments are increasingly 'sayable' imposes '(1) costs in litigation, (2) caution in drafting, and (3) general uncertainty on those who support, design, and implement the policies that the novel arguments call into question.'")(quoting Jedediah Purdy, Neoliberal Constitutionalism: Lochnerism for a New Economy, 77 LAW &CONTEMPT. PROBS. 195, 209 (2014)); Genevieve Lakier, *The First Amendment's Real Lochner Problem*, 87 U. CHICAGO L. REV. 1243, 1324 (2020) (the real Lochner problem concerns the ways in which First Amendment jurisprudence misconceives the liberty it protects).

[10] Friction-in-design regulation tends to surface only piecemeal, as a one-off proposal, often under the umbrella of consumer protection. *See, e.g.*, Rozenshtein, *supra* note 9, at 355-56 (considering friction-in-design measures proposed by Kyle Langvardt as examples of consumer protection law); *see also* Kyle Langvardt, *Regulating Habit-Forming Technology*, 88 FORDHAM L. REV. 129 (2019).

In this article, we show that the First Amendment is not an insurmountable barrier, and we reveal an open and mostly underappreciated regulatory territory to explore. We argue that much friction-in-design regulation should be understood as twenty-first century time, place, and manner (tpm) restrictions,[11] akin to laws that prohibit using megaphones in the middle of the night, require permits before marches, and keep "adult" theaters out of residential neighborhoods.[12] This does not mean that friction-in-design regulation would escape First Amendment scrutiny altogether, of course. But it would trigger intermediate rather than strict scrutiny, *so long as* the friction-in-design regulation remained content neutral.[13] In other words, not all friction-in-design regulations would qualify as content neutral time, place, and manner restrictions. The qualification criteria would operate as constraints on institutional (regulatory) design. We discuss various examples.

At the same time, we advance a novel governance theory that casts time, place, and manner restrictions as a useful regulatory model to bring online from the offline context and conventional First Amendment jurisprudence.[14] Properly understood, designed, and applied, time, place, and manner restrictions constitute a legitimate system for balancing individual freedom not only to speak but to communicate - to try to reach others with one's messages—with the collective (state) interest in maintaining social order and peace, both offline and online.[15] Indeed, time, place, and manner might work better online than offline, since online rules would cover large diverse groups and locations, and not be subject to the local politics that have sometimes led to distorted or even discriminatory laws.[16]

We begin in Part I with our opening claim that digital networked society needs friction-in-design regulation. We explain why current proposals for regulating big tech fall short, and we explain the stakes for humanity. As this Part primarily summarizes

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[11] Kyle Langvardt suggested this possibility and explored some useful examples. *See id.*

[12] *See, e.g.*, *Cox v. State of New Hampshire*, 312 U.S. 569 (1941); *Grayned v. City of Rockford*, 408 U.S. 104 (1972); *City of Renton v. Playtime Theatres, Inc.*, 475 U.S. 41 (1986); *Heffron v. International Soc. For Krishna Consciousness, Inc.*, 452 U.S. 640 (1981); Jay M. Zitter, Annotation, *State Constitutional Right of Freedom to Assembly Provisions*, 41 A.L.R.7th Art. 7 (Originally published in 2019).

[13] Content neutral friction-in-design regulations would not replace content-based regulations, of course; they would usefully supplement them.

[14] *See infra* Part III.

[15] *See infra* Part III.

[16] *See, e.g.*, *Reed v. Town of Gilbert*, 135 S. Ct. 2218, 2231-32 (2015).

prior work, we focus on friction as a locus of contestation between competing visions of digital networked society.

In Part II, we examine friction-in-design regulation—what it is, why it is needed, and why it should be rescued from the sidelines of tech policy discussions. We develop a descriptive framework consisting of six parameters and associated questions that provides a useful basis for evaluating and comparing different friction-in-design measures. We use this framework to explore speed bumps offline and online.

In Part III, we focus on the First Amendment. After brief background, we explain time, place, and manner (tpm) restrictions and relevant case law, reviewing and applying recent jurisprudence on content neutrality. We then develop our argument that tpm serves as a useful regulatory model offline and online. Specifically, we suggest that tpm-oriented friction-in-design regulation could provide a robust, reliable, and legitimate framework for public and private governance of shared techno-social environments.

In Part IV, we explore the regulatory territory our analysis has revealed, specifically considering whether and how friction-in-design regulations can be a type of content neutral tpm restriction. We sketch a few examples to shed light on the regulatory space and possibilities. We do not aim to defend each example fully as a regulatory proposal. In fact, we consider two examples that we recognize are not politically feasible and regardless would likely fail even under intermediate scrutiny. We use them instead to sketch the outer boundary of the potentially vast regulatory territory revealed by our proposal. We also discuss more feasible examples.

I. DIGITAL NETWORKED SOCIETY NEEDS FRICTION-IN-DESIGN REGULATION

A. Humanity's techno-social dilemma; why current regulatory approaches are not enough.

Calls for big tech regulation mostly focus on antitrust, consumer protection, content moderation, and privacy. [17] While

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[17] *See, e.g.*, Brody Ford, *Big Tech to Congress: Forget About Antitrust, Pass a Privacy Law*, BLOOMBERG (Apr. 8, 2022), https://www.bloomberg.com/news/articles/2022-04-08/big-tech-to-congress-forget-about-antitrust-pass-a-privacy-law, [https://perma.cc/N23E-QE5C]; LexisNexis, *Privacy, Algorithms, and Content Moderation Will Dominate Big Tech in 2022* (Dec. 9, 2021), https://www.lexisnexis.com/community/insights/legal/capitol-journal/b/state-

important, these are insufficient means for dealing with the social dilemmas and significant harms that arise in the digital networked society. For example, none of them addresses the rampant techno-social engineering of humans enabled by digital networked technologies, whether electronic contracting interfaces designed to nudge people into automatically clicking "I agree", the asymmetric use of friction in smartphone settings designed to maintain always-on geolocation tracking, or the deployment and seamless interconnection of supposedly smart devices (that don't usually make consumers any smarter but do afford intelligence-enabled power to others) in homes, vehicles, offices, schools, hospitals, and just about everywhere else. Nor do they prevent the viral spread of dangerous disinformation, which can lead to offline violence and death.[18] These are just a few examples of techno-social engineering that collectively threaten humanity.[19]

It may seem stark and even hyperbolic to suggest that what's at stake is *humanity*. We will not fully make the case here as that is not the focus of this article.[20] But we must clarify that the stakes are

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net/posts/sncj-2022-preview-big-tech, [https://perma.cc/MT5K-9GAA]; Maria Curi, *Tech Antitrust Bill Stokes Content-Moderation Worries (Correct)*, BLOOMBERG LAW (May 12, 2022), https://news.bloomberglaw.com/privacy-and-data-security/tech-antitrust-bill-stokes-lawmaker-content-moderation-worries, [https://perma.cc/P9GZ-AD4C]; Cat Zakrzewski, *Senator Introduces Bill Giving Big Tech Its Own Federal Watchdog*, THE WASHINGTON POST (May 12, 2022), https://www.washingtonpost.com/technology/2022/05/12/michael-bennet-big-tech-regulator/, [https://perma.cc/K6UK-2BRY]; Bill Baer, *Addressing Big Techs Power Over Speech*, BROOKINGS INSTITUTE (Jun. 1, 2021), https://www.brookings.edu/blog/techtank/2021/06/01/addressing-big-techs-power-over-speech/, [https://perma.cc/G2XG-QF4X]; Valerie C. Brannon, CONGRESSIONAL RSCH. SERV., *Regulating Big Tech. Legal Implications* (Sept. 11, 2019), https://sgp.fas.org/crs/misc/LSB10309.pdf, [https://perma.cc/NX86-QK86].

[18] *See e.g.*, Paul Mozur, *A Genocide Incited on Facebook, With Posts From Myanmar's Military,* N. Y. TIMES (Oct. 15, 2018), https://www.nytimes.com/2018/10/15/technology/myanmar-facebook-genocide.html [https://perma.cc/U3AM-KJVD]; U.N. Human Rights Council, *Detailed findings of the Independent International Fact-Finding Mission on Myanmar*, A/HRC/42/CRP.5 (September 27, 2019) (describing the military's use of "virtual identities"); Election Integrity Partnership, *The Long Fuse: Misinformation and the 2020 Election* (Mar. 2, 2021), https://purl.stanford.edu/tr171zs0069, [https://perma.cc/QY8R-G2TD].

[19] There are just a few of the many examples explored in Frischmann and Selinger's book, *see supra* note 2.

[20] For systematic, interdisciplinary scholarship about digital networked society and the stakes for humanity, civil society, and future generations, *see id.*; Shoshana Zuboff, THE AGE OF SURVEILLANCE CAPITALISM: THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER (NEW YORK: PUBLIC AFFAIRS 2019); Zeynep Tufekci, TWITTER AND TEAR GAS: THE POWER AND FRAGILITY OF NETWORKED PROTEST (Yale Univ. Press 2017); Jamie Susskind, THE DIGITAL

much more than reduced consumer welfare from anticompetitive behavior, concentrated markets, and false and misleading business practices; harmful content flowing on social media;[21] predatory advertising practices; inappropriate collection, transfer, and use of personal information; gaming addiction;[22] and the various other harms cognizable in existing laws and consistently raised in public discourse focused on antitrust, content moderation, and privacy. These harms matter but are best appreciated as consequences of a complex problem, a global tragedy of the commons style dilemma, which Frischmann and Selinger diagnose in detail and describe as *humanity's techno-social dilemma*.[23] They claim that humanity, conceived of as a shared set of normative commitments (ideals) about who we are and aspire to be, reflected in us and our built world of imagined realities, institutions, infrastructures, and environments, is at risk of deterioration by pervasive techno-social engineering.[24] They focus on specific forms of techno-social engineering that affect basic capabilities essential to human flourishing, including various "thinking" capacities, the ability to socialize, trust, and relate to each other, free will, autonomy, and agency. Across cultures and generations, humans have engineered societies and built environments to sustain these and other core capabilities. In their (and our) view, this contingent, shared heritage, a viable conception of humanity, is what is fundamentally at stake for digital networked society.[25]

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[21] There are many more forms of harmful content than is often recognized. *See, e.g.,* Helen L. Norton, *Manipulation and the First Amendment*, 30 WILLIAM & MARY BILL OF RIGHTS JOURNAL 221, 224 (2021) (describing manipulation as content that covertly influences peoples' decision-making by targeting and exploiting their decision-making vulnerabilities).

[22] *See e.g.* Langvardt, *supra* note 10.

[23] Frischmann & Selinger, see *supra* note 2, at 8-10, 245-250.

[24] Following Frischmann and Selinger, *supra* note 2, we endorse pluralism and do not mean to suggest there is a universal set of commitments or a singular "us." As they note, "We – as societies, as communities, as generations, as families, as individuals – answer [a set of] constitutional questions [about these normative commitments] directly and indirectly through our actions and the cultures, institutions, infrastructures, and environments we build and sustain." *Id.* at 248. On the idea that preserving the "fundamental blessings" of humanity is the most important constitutional commitment that unites cultures across generations, *see* Abraham Lincoln, *The Perpetuation of Our Political Institutions*, Address Before the Young Men's Lyceum of Springfield, Illinois (Jan. 27, 1838).

[25] This conception of humanity is not merely theoretical. It is manifest in intergenerational commitments, international human rights law and other social institutions, and shared infrastructures. See Frischmann and Selinger, supra note 2. "Despite [] disagreement and diversity, there are some widely shared core ideals, for example, as reflected in the Universal Declaration on Human Rights. These multinational, macro-level normative commitments answer some of the most fundamental constitutional questions about who we are and aspire to be

Accordingly, in this article, we focus on the needs of digital networked society and thus on digital networked technology regulation broadly, rather than big tech regulation, antitrust, consumer protection, content moderation, or privacy.[26] Big tech is to humanity's techno-social dilemma what Big Fossil Fuel is to climate change: a vital piece of the puzzle but not all of it. Big tech is not solely responsible for the relevant harms. Antitrust law, on which some would rely for reforms, is no panacea. Even if digital technology, advertising, and platform markets all met an economist's dream of perfect competition, there would still be massive externalities and corresponding social demand for governance.[27] Consumer protection laws are important but again just one piece of the regulatory framework. Unfortunately, focusing narrowly on humans as "consumers" in the context of protecting them has powerful framing effects: it is reductionist; it risks treating complex social interactions as mere commercial transactions; it assumes away many potentially important externalities; and it imports a host of bad assumptions and premises about their respective roles, capabilities, and relationships with others involved in complex, technologically-mediated social interactions.[28] Bodies of law that historically evolved to protect consumers need to adapt to protect human beings engaged in complex, technologically-

collectively. International human rights laws and institutions create a global community committed to cross-cultural standards and moral floors. These and other political processes enable but do not guarantee moral progress over time and across generations and cultures." *Id.* at 248-49. For an interesting take on moral floors, *see* Martha Nussbaum, *The Capabilities Approach and Ethical Cosmopolitanism: A Response to Noah Feldman,* YALE LAW JOURNAL POCKET PART, 117, 126 (2007). ("any minimally just society will make available to all citizens a threshold level of ten central capabilities, as core political entitlements."); Martha Nussbaum, CREATING CAPABILITIES: THE HUMAN DEVELOPMENT APPROACH 33-34 (CAMBRIDGE, MA: HARV. UNIV. PRESS 2011).

[26] Langvardt has also highlighted the role of gambling law as a source of similar regulation, *see supra* note 22; we do not address that law in this paper since it would apply to only a narrow subset of online activity.

[27] Perfect competition does not eliminate externalities. *See* Brett Frischmann, INFRASTRUCTURE: THE SOCIAL VALUE OF SHARED RESOURCES 330-32 (2012) (debunking the competition red herring in the network neutrality debate). Competition can be overprescribed. *See* Maurice E. Stucke & Ariel Ezrachi, COMPETITION OVERDOSE: HOW FREE MARKET MYTHOLOGY TRANSFORMED US FROM CITIZEN KINGS TO MARKET SERVANTS (2020).

[28] Each of these points can be developed further, and there are academic pieces we could cite. But the assertions are also supportable with just a little common sense. Consider, for example, a typical person using a social media platform. To call this person a "consumer" is not incorrect. It is incomplete, and it leaves out what is probably most important both for that person and other people with whom that person socializes using the platform, and for diagnosing and evaluating various social dilemmas and governance challenges, including but not limited to privacy, security, mis/disinformation, and so on.

mediated social interactions in which they act or behave in part as consumers but also and often more importantly not as consumers. Privacy, whether seen as a species of consumer protection or as constitutional protection of more fundamental values, also fails to fully capture the stakes or provide sufficient meaningful governance.[29] Personal data is often infrastructural (meaning it is nonrivalrous, cheaply sharable and reusable, and a multi-use input subject to function creep) and often affords substantial (hidden) power to exert intelligence-enabled social control.[30] Private and public actors often exercise such power through techno-social systems engineered to capture and hold human attention.[31] Some scholars thus focus on the so-called attention economy.[32] In our view, however, attention is best understood (at least in these debates) as a gateway to and from human minds, a conduit between the external and the internal. Thus, techno-social engineering of humans via attention matters because it impacts human minds and free will. We and others explore this in greater detail elsewhere.[33]

The root problem is not digital networked technologies per se but rather the underlying economic, social, and political logics that have driven and continue to drive the development, design, and deployment of such technologies. As Frischmann and Selinger (2018) explain, the logics fetishize computational power, aim to implement and extend the Taylorist ideal of scientific (data-driven) management of human beings throughout their lives, and embrace optimization of techno-social systems in service of efficiency, productivity, and a rather thin conception of (manufactured) happiness. It is a complicated story to tell. To simplify, and cut to the chase for this article, we note that the logics support a few simple design mantras, familiar in law, economics, and engineering:

Digital networked technologies and corresponding techno-social systems ought to

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[29] On privacy law as constitutional law and as consumer protection law, *see generally* Daniel J. Solove & Paul Schwartz, INFORMATION PRIVACY LAW, (ASPEN 7th ed. 2020) .

[30] Frischmann, *supra* note 27; OECD, Data-Driven Innovation: Big Data for Growth and Well-Being (2015); Frischmann and Selinger, *supra* note 2 (explaining how infrastructural data afford hidden power to exert intelligence-enabled social control; also explaining function creep); Margot E. Kaminski, *Data as speech Infrastructure*, (2022) (on file with the author).

[31] *See* Frischmann and Selinger, *supra* note 2.

[32] *See* Tim Wu, THE ATTENTION MERCHANTS: THE EPIC SCRAMBLE TO GET INSIDE OUR HEADS (PENGUIN 2017); Tim Hwang, SUBPRIME ATTENTION CRISIS: ADVERTISING AND THE TIME BOMB AT THE HEART OF THE INTERNET (2020); Elettra Biette, FROM DATA TO ATTENTION INFRASTRUCTURES: REGULATING EXTRACTION IN THE ATTENTION PLATFORM ECONOMY, (on file with the author) .

[33] *See supra* note 18.

- *maximize efficiency;*
- *minimize transaction costs;*
- *eliminate friction;*
- *seamlessly interconnect;*
- *increase speed, scale and scope of engineered (technologically-mediated) interactions; and*
- *democratize [fill in with whatever you like (e.g., commerce, culture, education, innovation, knowledge, news, speech)].*[34]

Each of these mantras is superficially defensible yet deeply flawed upon examination. These conventional wisdoms are not just wrong. Worse, they mislead, and obscure important social, political, and economic issues and the stakes for humanity.

Human beings are necessarily inefficient: we need friction in our lives.[35] Seams are critical to governance. We need boundaries for ourselves and communities. Interconnection often should be seam*ful*, as that friction provides opportunity/space for governance. Growth in scale and scope is often overrated as it can have substantial hidden tradeoffs, especially involving externalities. Democratize, like innovation, has become a useless buzzword that hides considerations of power, quality, and meaning, among other things. In this article, we focus mostly on friction.[36]

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[34] *See* Frischmann & Selinger, *supra* note 2.

[35] *See id.*; *see* also Paul Ohm & Jonathan Frankle, *Desirable Inefficiency*, 32 FL. L. REV. 357 (2018), https://scholarship.law.ufl.edu/flr/vol70/iss4/2 [https://perma.cc/JZ5LF5PT] (explaining the value of inefficiency); David M. Driesen, Shubha Ghosh, *The Functions of Transaction Costs: Rethinking Transaction Cost Minimization in a World of Friction*, 47 ARIZ. L. REV. 61 (2005), (same with respect to inefficiency and transaction costs).

[36] In addition to the sources cited in the previous note, *see* Shubha Ghosh, *Time, Scarcity, and Abundance*, 7 FRONT. RES. METR. ANAL., SEC. RESEARCH POLICY AND STRATEGIC MANAGEMENT (August 31, 2022); Ellen P. Goodman, *Digital Information Fidelity and Friction: Crafting a systems-level approach to transparency,* KNIGHT FIRST AMENDMENT INSTITUTE AT COLUMBIA UNIVERSITY, Feb. 26, 2020, https://knightcolumbia.org/content/digital-fidelity-and-friction, [https://perma.cc/JQ8S-GQER]; Ellen P. Goodman, *Digital Fidelity and Friction*, 21 NEVADA L. J. (2021); *see* also Evan Selinger, Altman, E., & Foster, S., *Eye-Tracking in Virtual Reality: A Visceral Notice Approach for Protecting Privacy*, 2 PRIVACY STUDIES JOURNAL 1–34 (2023) (visceral notice as a friction-in-design strategy); M. R. Calo, *Against Notice Skepticism in Privacy (and Elsewhere)*, 87 NOTRE DAME L. REV. 1027 (2013) (examining visceral notice strategy). Ryan Calo defines friction quite differently than us. *See* Ryan Calo, *Code, Nudge, or Notice?*, 99 IOWA. L. REV. 773, 777-78 (2014) (friction "refers to creating barriers—physical or otherwise—to the conduct citizens would otherwise carry out," and contrasting friction with facilitation). We maintain that friction can facilitate and support affordances. Calo is concerned with government using

B. *Friction; why we need some.*

The relentless pursuit of frictionless transactions in our modern digital networked environment is a driving factor behind surveillance capitalism [37]—the extraction and monetization of personal data—and the creep of digital Taylorism--the use of such data to "scientifically" manage most facets of our lives, in order to efficiently deliver cheap bliss and convenience.[38] Yet there is much more to being human than the pursuit of such shallow forms of happiness.[39]

To flourish, human beings need some friction in their decision-making and social interactions. Friction is resistance. It slows things down. In our hyper-rich, fast-paced, attention-deprived world, friction affords us opportunities to stop and think, to deliberate and even second-guess ourselves and others. This is how we develop the capacity for reflection; how we experiment, learn and develop our own beliefs, tastes, and preferences; how we exercise self-determination. This is free will in action.

Humans are social beings. Meaningful relationships involve and even require friction. This is true of intimate, professional and even purely commercial relationships. Consider one critical ingredient of a meaningful relationship: *trust*. When you've got it, trust can lower transaction costs, but building and, crucially, maintaining trust often requires work. Again, that's true of any meaningful relationship. When you eliminate all friction, you risk removing the relationship and being left with blind trust in strangers.

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friction as a substitute for law and in doing so precluding citizens from engaging in the "same processes that attend law." *Id*. at 798. We share the basic concern.

[37] Shoshana Zuboff, BIG OTHER: SURVEILLANCE CAPITALISM AND THE PROSPECTS OF AN INFORMATION CIVILIZATION, 30 J. INFO. TECH. 75, 75–89 (2015).

[38] *See* Tim Wu, *The Tyranny of Convenience*, N.Y TIMES, (Feb. 16, 2018); Brett Frischmann & Evan Selinger, *Robots Have Already Taken Over Our Work, But They're Made of Flesh and Bone*, THE GUARDIAN, (Sept. 25, 2017); *see* generally Frischmann & Selinger, *supra* note 2.

[39] This and the next five paragraphs are adapted from Brett Frischmann, *Here's Why Tech Companies Abuse Our Data: Because We Let Them*, THE GUARDIAN (Apr. 10, 2018), https://www.theguardian.com/commentisfree/2018/apr/10/tech-companies-data-online-transactions-friction, [https://perma.cc/WKR4-K4NG].

We want neither to eliminate friction nor to have too much of it.[40] It is, after all, costly. Even trying to figure out how much friction is desirable can be costly, and in some contexts debilitating. Paralysis by analysis is a frightening prospect. It's easier to abandon such deliberation and accept defaults, often set by others. In the jargon of leading behavioral law and economics scholars, we ostensibly choose not to choose. This convenient "choice" is only made easier and unavoidable in our modern data-rich economy.

Some digital tech cheerleaders like to describe data as "the new oil," using the metaphor to push an economic agenda.[41] They see data as the raw material that will drive the engines of economic growth. Ironically, they don't recognize how the metaphor also highlights the substantial negative externalities--social costs--generated by their agenda.[42]

The powerful metaphor works in a different way: Data is the oil that eliminates friction (resistance) and greases the slippery slope for engineering humans to behave like simple machines. Data and the "smart" techno-social systems data enables are re-engineering the environments within which we live our lives, including our workplaces, playspaces, schools, hospitals, and homes.[43] As a result, we're becoming increasingly predictable and programmable, as we perform scripts supplied by algorithmic systems that supposedly know what we want and need, better than we ourselves know.[44]

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[40] *See, e.g.*, William McGeveran, *The Law of Friction*, 2013 U. CHI, LEGAL F. 16, 18 (2013) (making this point). "Imagine a mechanical engineer who declares that her goal is to eliminate friction, period. We would view this as insane. The world cannot function without friction. The goal should be to have the right amount of friction, in the right place, in the right time. Yet our discipline seems committed to the total elimination of friction in computing." Moshe Y. Vardi, *Fricative Computing: Let's bring friction back into computing*, 56 Communications of the ACM 5 (May 2013), https://doi.org/10.1145/2447976.2447977 [https://perma.cc/CB4C-M3H9].

[41] *See* Dennis D. Hirsch, *The glass house effect: Big Data, the new oil, and the power of analogy*, 66 ME. L. REV. 373 (2013); Heather Broomfield & Lisa Reutter, *In Search of the Citizen in the Datafication of Public Administration*, 9 BIG DATA AND SOC'Y. 1 (2022); Brett Frischmann, *Here's Why Tech Companies Abuse Our Data: Because We Let Them*, THE GUARDIAN (Apr. 10, 2018), https://www.theguardian.com/commentisfree/2018/apr/10/tech-companies-data-online-transactions-friction, [https://perma.cc/WKR4-K4NG]

[42] *See* Hirsch, *supra* note 41; Joshua New, *Why Do People Still Think Data Is The New Oil*, CENTER FOR DATA INNOVATION (Jan. 16, 2018), https://datainnovation.org/2018/01/why-do-people-still-think-data-is-the-new-oil/, [https://perma.cc/3SED-U82R] (criticizing the data as new oil metaphor, emphasizing externalities).

[43] *See* Frischmann & Selinger, *supra* note 2.

[44] *Id.*

One counter-intuitive response to this social dilemma is to deliberately engineer friction *into* and *between* rather than out of various techno-social systems.[45] Society could embrace politically, technologically, and socially engineered transaction and interaction costs.[46]

Consider a familiar example. [47] Modern electronic contracting often depends on a seamlessly designed human-computer interface that creates a binding contract through the simple act of clicking or tapping a virtual button. Some lawyers and economists celebrate this mechanism for minimizing transaction costs and eliminating friction in the formation of a contract. This view is dangerously myopic. It focuses on efficiency gains and ignores subtle but powerful impacts on human autonomy.

By design, the click-to-contract mechanism is nearly frictionless. It is rational for a user to blindly accept the terms of use. To read the terms would be a waste of time, an irrational and futile exercise. Even if you are a glutton for punishment and wish to stop, read, and deliberate, how would you choose which e-contract is worth the time and effort? After all, you enter into so many of them, and they've spread like wildfire, from websites to apps to smart televisions to all of the other devices in your workplace, automobile, and home. The rational response is to follow the script: click 'I agree', since the only alternative is not to use the thing at all, and trust the market, the wisdom of the crowd, the judicial system–notably, all abstractions and strangers–to watch your back.

Frictionless e-contracting makes a mockery of contracting, which is premised on parties genuinely exercising their autonomy when deciding to enter a binding legal relationship. Instead, these are contracts of adhesion because of the extremely disproportionate bargaining power of tech companies. At best, the e-contracting mechanism generates the illusion of consent through automatic and even programmed behavior. Mindless clicking becomes routine.

One solution is to deliberately engineer friction and transaction costs into human-computer interfaces and other digital networked technology. So, for example, if we are to engineer

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[45] *Id*. at 274-88. *See also* Julie Cohen, Configuring the Networked Self: Law, Code, and the Play of Everyday Practice. (Yale Univ. Press 2012).

[46] Transaction costs are not synonymous with friction, although the concepts overlap. Friction is much broader in the sense that it is not limited to situations involving transactions. We thank Helen Norton for emphasizing this point.

[47] This and the following paragraph build from chapter five in Frischmann & Selinger, *supra* note 2.

friction into electronic contracting, how should we do so? How far would we go? Too much friction would probably grind the digital economy to a halt. For some, this might be desirable. But that is not our position.

Introducing friction in contracting is analogous to placing speed bumps on residential streets, which we explore in more detail in the next Part. No one advocates for speed bumps on all streets. Speed bumps are deployed selectively, typically by municipalities, to inject friction as needed to calm traffic and thereby serve the social goals of economic efficiency,[48] public order, safety, and shared use of streets.

In many contractual contexts, engineered speed bumps that enable consumers to stop and think about the most salient features of a transaction would be justified as a design intervention that preserves genuine autonomy and prevents users from being nudged to click-upon-cue.[49] Frischmann and Selinger offer a few possibilities, including that courts refuse to enforce automatic contracts and instead require evidence of actual deliberation by consumers about the most important substantive terms of a contract.[50] The generation of such evidence would require digital speedbumps, the design of which could be left open-ended.[51]

Contractual speed bumps could be a feature of a website or human-computer interface that generates a time delay and requires some form of labor by the user. For example, a rather old (in Internet terms) e-contracting friction-in-design feature requires the user to scroll over the terms of a proposed contract before being allowed to manifest assent (typically, by clicking a virtual "I agree" button) and proceed with the transaction. Another rather unconventional but possibly attractive friction-in-design feature presents salient information regarding the most important terms of the contract for a user to process and then asks a question to test user comprehension of that information. Of course, both of those features could be

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[48] As we discuss below, speed bumps can be an effective means for internalizing interaction effect externalities and thereby achieving economic efficiency. *See infra* Part II.A.

[49] The benefits noted in the text arise for each individual transaction or contracting experience. There also may be dynamic benefits such as positive social learning about the salient features of contracts and the legal relationships formed by those agreements as well as preventing negative social learning in the form of habituation to click-upon-cue behavior.

[50] *See* Frischmann & Selinger, at 291-93 (proposing a deliberation principle and various speed bumps).

[51] This may be one way to ensure that the law requiring friction-in-design remains content neutral.

incorporated into a contractual speed bump. A huge variety of friction-in-design measures could be introduced.[52] The direct costs (for users) associated with contractual speed bumps vary considerably, but the most basic cost is a small delay; additional costs could include cognitive labor, inconvenience, and annoyance. Some would argue increased transaction costs would necessarily be inefficient and hamper innovation, but those effects would need to be proven and measured, rather than simply assumed, and then compared with social benefits. After all, the same arguments could be made about physical speed bumps on roads.

Beyond electronic contracting are legion examples of digital networked technologies optimized by design for superficial engagement: just think about your daily routines on screens and how many hours of your day you perform scripts, clicking, tapping, and swiping upon cue.

Social media platforms are a prime example. Examples include Facebook, Instagram, LinkedIn, Twitter, Pinterest, Snapchat, WeChat, YouTube, Reddit, TikTok, and Nextdoor. These platforms vary in form, function, scale, scope, and architectural design. All of them:

> *(1) provide a software-enabled, user-friendly, human-computer interface through which people with an Internet connection can create and maintain a digital identity (user profile); find and connect with others;*

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[52] *See, e.g.,* Frischmann & Selinger, at 291-93. Adapting rules proposed by Ian Ayres in 2012, Lauren Willis offers friction-in-design type rules for consumer transactions. *See* Lauren Willis, *Deception by Design* 34 HARV. J. L.&TECH. 116, 185 (2020) ("[B]usinesses could design sales interfaces to:
> (1) ensure that consumers cannot blindly agree to transactions, such as by requiring consumers to confirm agreement in a manner that cannot be done mindlessly;
> (2) interpose warnings about costs and risks consumers will face if they engage in the transaction;
> (3) force consumers to remain on a screen long enough to read, listen to, or watch a clear and accurate explanation of the costs, risks, and limitations on benefits of the transaction before consumers can engage in the transaction;
> (4) require consumers to pass a test demonstrating understanding of facts that are material to the transaction
> before consumers can engage in the transaction; or
> (5) give consumers an easy way to reverse transactions after the fact."

(adapting rules proposed in Ian Ayres, *Regulating Opt-Out: An Economic Theory of Altering Rules*, 121 YALE

L.J. 2032, 2068–80, 2083–84 (2012)).

cultivate relationships and join groups/networks; and interact with each other and content in various ways;

(2) host content supplied by users on platform servers, and process, curate, and distribute such content to other users and sometimes the public, generally via complex, algorithmically managed distribution systems;

(3) mediate interactions among users through various applications and services (sometimes directly and sometimes indirectly, e.g., through API design and governance);

(4) surveil everything—that is, collect, process, and use data and data-derived intelligence about who says what to whom, when, and how, and about user behavior, reactions, preferences, and relationships; and

(5) govern all of the above through a complex system of formal and informal processes, technical design, and other institutional, administrative, and technocratic mechanisms.

Content moderation is one of the governance processes.[53] Most social media platforms are multi-sided, meaning that the platforms service the demands of many different sets of users. Ordinary people socializing with each other are not the only set of customers to whom social media platforms provide services. Other platform users include a wide range of commercial and non-commercial suppliers of entertainment, news, apps, games, and other forms of content. And of course, advertisers are another especially important set of users to whom platforms cater. After all, advertising is how most platforms generate revenue. The manners in which these various sets of users "use" (and are used by) the platforms vary as well. But overall, each of the five sets of actions and practices serve the objective function for the heavily engineered social media system, which is maximizing revenue through user engagement.

User engagement may sound appealing, participatory, even deeply meaningful–at least to people not already inculcated with digital advertising jargon, but the reality is that the style of communication and behavior by ordinary users that matters most from a revenue generating standpoint is mundane and superficial: stay on the platform and keep on clicking, swiping, consuming, and sharing.[54] Consider three common examples of system design

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[53] *See generally* Kate Klonick, *The New Governors: The People, Rules, and Processes Governing Online Speech*, 131 HARV. L. REV. 1598, 1648-58 (2018).

[54] On architectural design for frictionless sharing, *see* McGeveran, *supra* note 40.

features optimized for such engagement. First, continuous or infinite scrolling is one way to maximize time spent on an app. This standard design feature loads new content as a user approaches the bottom of the screen or the end of a video so that the user need not wait for more, nor stop and think about how and whether to proceed or leave the platform. It eliminates what would otherwise be a *seam for self-governance*. Second, superficial communication scripts, such as affirmation by one-click buttons (likes, stars, hearts), are another standard design feature that makes a particular style of engagement frictionless.[55] It makes collection of data about user preferences frictionless too. Plus, it shapes the style and content of user communications, as users cater to anticipated demands of weak ties and non-ties (strangers) for click-worthy content,[56] and provides a feedback mechanism with a little dopamine kick to boot.[57] Third, many social media platforms algorithmically moderate feeds for users, essentially prioritizing the order in which posts, advertising, and other content are presented (or not). While it is difficult to generalize about such moderation, one thing we can say is that the objective function remains the same, as does the commitment to the basic design mantras noted above.[58]

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[55] Another example is prompts for users to send, by mere click of a button, a prefabricated message, such as "Happy birthday!" or "Congrats on your work anniversary!"

[56] This is a hypothesis in need of empirical study. One of us conducted a study using fake birthday notifications on Facebook to explore this type of behavior. *See* Katherine Haenschen, Brett Frischmann, & Paul Ellenbogen, *Manipulating Facebook's Notification System to Provide Evidence of Techno-Social Engineering*, SOCIAL SCIENCE COMPUTER REVIEW, 1-18 (2021). Much more research on this topic is needed.

[57] "Little dopamine kick" is a catchy short phrase that usefully captures the essence of a more complicated phenomenon. Dopamine is one of many neurotransmitters, and it plays important roles in human psychology, particularly in reinforcing learned behavior. Dopamine release is associated with rewards from both anticipated and actual behavior or actions. For more on how techno-social engineers design systems to take advantage of human reward systems, including but not limited to dopamine release, *see* Simon Parkin, *Has dopamine got us hooked on tech?*, THE GUARDIAN, Mar. 4, 2018, https://www.theguardian.com/technology/2018/mar/04/has-dopamine-got-us-hooked-on-tech-facebook-apps-addiction, [https://perma.cc/VG6V-YCZN] (survey and discussing the example of Dopamine Labs); Natasha Dow Schüll, ADDICTION BY DESIGN: MACHINE GAMBLING IN LAS VEGAS (2012). On dopamine and addiction, *see* Marcello Solinas et al., *Dopamine and addiction: what have we learned from 40 years of research*. J NEURAL TRANSM 126, 481–516 (2019).

[58] As with the contracting example, a great variety of friction-in-design measures could be introduced to encourage meaningful engagement and discourage superficial engagement, enable self- and community-governance, support cultivation of trustworthy relationships, and so on. There are various frictional countermeasures for each of the examples noted in the text. We discuss some in subsequent sections. It is worth emphasizing that there are tradeoffs and

Social media companies have steadily prioritized engagement and continued to control online spaces largely on their own, although even their leaders concede that it is too much for them to handle alone.[59] In the early days of the internet, some tech titans resisted governing at all, arguing that their platforms were mere conduits, like public utilities, providing the means for communication but not the substance, so they were free of responsibility for online content and its numerous harmful effects. Some governments have stepped in, imposing legal liability on the companies for content that is unlawful in their territory. These laws vary from country to country, of course, and companies comply with them only as much as they must; so those laws do not provide a systematic basis for rulemaking. In the United States, courts initially grappled with applying common law (e.g., defamation) and existing statutes (*e.g.*, copyright) to deal with disputes involving platforms that hosted user generated content, and then in the mid-to-late 1990s, Congress got involved. The Communications Decency Act (1996) and the Digital Millennium Copyright Act (1998), for example, reflect different approaches to intermediary regulation. The DMCA sets up a notice-and-takedown approach that links modest responsibility to a safe harbor while section 230 of the CDA provides strong immunity from most lawsuits without imposing responsibilities.[60] Both of these regimes shaped private regulation and content moderation, largely by leaving what to do and how to do it up to the companies. As various social harms have become increasingly obvious and widespread, [61] some companies have

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competing values to consider; the primary impetus of this Article is to reveal an unappreciated and underexplored territory to explore more rigorously.

[59] *See, e.g.* Mark Zuckerberg, *The Internet Needs New Rules. Let's Start in These Four Areas*, THE WASH. POST (Mar. 30, 2019) ("Lawmakers often tell me we have too much power over speech, and frankly I agree.").

[60] Compare 17 USC 512 with 47 USC 230. Also compare Daphne Keller, *The Right Tools: Europe's Intermediary Liability Laws and the 2016 General Data Protection Regulation*, 22 BERKELEY TECH. L.J. 297, 305-15 (2018); *see generally* Patricia Bellia, Paul Berman, Brett Frischmann, and David Post, CYBERLAW: PROBLEMS OF POLICY AND JURISPRUDENCE IN THE INFORMATION AGE (5th ed. 2017).

[61] *See supra* text accompanying notes 17-36 (discussing humanity's techno-social dilemma). On the role of social media in terrorist recruitment, organizing and inciting mass violence, *see e.g.* Imran Awan, Cyber-Extremism, *Isis and the Power of Social Media*, SOCIETY 54, 138-149 (2017); Paul Mozur, *A Genocide Incited on Facebook, With Posts From Myanmar's Military*, N. Y. TIMES (Oct. 15, 2018), https://www.nytimes.com/2018/10/15/technology/myanmar-facebook-genocide.html , [https://perma.cc/3TMT-BXYF]; Muslim Advocates and the Global Project Against Hate and Extremism, *Complicit: The Human Cost of Facebook's Disregard for Muslim Life* (Oct. 2021), https://globalextremism.org/reports/complicit [https://perma.cc/92KG-ZBMJ]; Özen Odag, Anne Leiser, and Klaus Boehnke, *Reviewing the Role of the Internet*

increased their efforts and begun to accept a certain degree of responsibility for which content they permit to remain online and for how quickly and widely they circulate it. Still, on the whole, the industry has failed to regulate effectively or systematically. Companies take swipes at online governance, piecemeal, with constantly changing rules.[62]

We have argued that society needs digital networked technology regulation that addresses humanity's techno-social dilemma by undermining and even counteracting the dominant logics and associated design mantras that have shaped the slippery sloped path we are on. In particular, we have argued in favor of friction, friction-in-design, and even friction-in-design regulation. Bear in mind that these three are not the same. Friction exists in many different forms and is not always a feature of design. Descriptively it can be, and normatively, sometimes it should be. As we discuss below, companies have implemented friction-in-design measures, often to serve their own interests and sometimes to promote a societal goal. But such efforts are hardly systematic or representative of what can be done. The simple reason is that dominant logics, design mantras, and private (firm-level) objective functions get in the way. Similarly, as we also discuss below, governments have implemented friction-in-design regulations–so extensively offline that we may take it for granted–but such efforts for digital networked technologies remain underwhelming and underexplored. Again, the dominant logics and mantras get in the way, but so does the First Amendment and the unwarranted perception that regulating digital technologies would run into a strict scrutiny wall. Before turning our attention to the First Amendment, we explore friction-in-design and friction-in-design regulation more thoroughly.

II. FRICTION-IN-DESIGN AND FRICTION-IN-DESIGN REGULATION

In this Part, we map the regulatory territory we wish to open up for consideration, empirical research, and policy development. We begin with friction-in-design and suggest a preliminary

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in Radicalization Processes, J. FOR DERADICALIZATION 21 (2019), Susan Benesch, *The Insidious Creep of Violent Rhetoric*. NOĒMA, Mar. 8, 2021, https://www.noemamag.com/the-insidious-creep-of-violent-rhetoric. [https://perma.cc/K5MG-CUU2]

[62] Content moderation, including but not limited to algorithmic moderation, is emblematic. *See* Kate Klonick, *The New Governors: The People, Rules, and Processes Governing Online Speech*, 131 HARV. L. REV. 1598 (2018); Tarleton Gillespie, *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions that Shape Social Media* (Yale Univ. Press, 2018).

framework, consisting of six descriptive parameters and associated questions, to evaluate and compare different examples.[63] We discuss a few examples, including speed bumps (offline) and CAPTCHAs (online). [64] Then we turn our attention to friction-in-design regulation, explaining why it is needed and why it remains sidelined in the current tech policy discussions.

A. Friction-in-design

Friction-in-design is quite common, because it often works well in serving instrumental societal needs. A familiar example is the speed bump. Any bump in the road adds friction for those driving over it. There is the literal friction or drag on the tires; regardless of what the driver does, this slows down the vehicle. But this is not really the most relevant friction in speed bump design.[65] There also is friction associated with other costs, such as shock, discomfort to passengers, wear and tear, and damage to the vehicle. These costs depend on the speed at which the car goes over the bump and the design of the bump. A driver who thinks about these costs may moderate their speed,[66] and indeed research in many countries has found that this friction works: speed bumps lead to reduced speeds and fewer pedestrian injuries and deaths. [67] Speed bumps are architectural features of a road designed (i) to introduce a specific type of friction that triggers such considerations (ii) for the

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[63] We expect that this framework will evolve, much like the Governing Knowledge Commons Framework. *C.f.* GOVERNING KNOWLEDGE COMMONS (Brett Frischmann, Michael J. Madison, & Katherine J. Strandburg eds., 2014); GOVERNING MEDICAL KNOWLEDGE COMMONS (Katherine J. Strandburg, Brett Frischmann, & Michael J. Madison, eds., 2017); GOVERNING PRIVACY IN KNOWLEDGE COMMONS (Madelyn Rose Sanfilippo, Katherine J. Strandburg & Brett M. Frischmann eds., 2021); GOVERNING SMART CITIES AS KNOWLEDGE COMMONS (Brett M. Frischmann, Michael Madison, and Madelyn Rose Sanfilippo, eds., 2023).

[64] If bumps could talk, the speed bump would say "not so fast, account for other users of the road" and the CAPTCHA would say "not so fast, show me you're human and not a bot."

[65] As Tarleton Gillespie explains: "A speed bump is more than just concrete. We treat it with a respect we do not afford to other slabs of concrete, because it speaks its own significance. It is laden with a general sense of authority bestowed upon it by the institutions that put it there." TARLETON GILLESPIE, WIRED SHUT 85 (2007). It "speaks" in part through its design.

[66] Economists will recognize the speed bump as an intervention (institution) that enables and encourages the internalization of certain types of externalities. The driver does not actually consider all of the third-party effects of their driving speed, but the set of costs associated with the bump serve as a functional proxy that when accounted for by the driver may achieve a similar outcome, which is speed moderation.

[67] *See e.g.,* June M. Tester et al., *A Matched Case–Control Study Evaluating the Effectiveness of Speed Humps in Reducing Child Pedestrian Injuries*, 94 AM. J. PUBLIC HEALTH 646, 646 (2004).

functional purpose of inducing behavioral change (speed moderation) and (iii) to promote the social ends of safety and public order.[68] As with all friction-in-design measures, there are tradeoffs and politics.[69] Speed bumps have social costs to consider; for example, they may interfere with emergency vehicles.[70] There are countless interesting examples and a rich literature that spans multiple disciplines including science and technology studies, computer science, civil engineering, and economics, to name a few.

Two prominent, related fields of interdisciplinary research and practice are privacy-by-design and security-by-design.[71] Combining insights from decision research, behavioral economics, psychology, human-computer interaction, persuasive technology,

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[68] Of course, when a bump in the road is the result of a branch that fell off a tree during a storm, it is not friction-in-design, although it may have the same effects.

[69] On the inevitable politics of speed bumps, friction-in-design measures, and technological artifacts more generally, *see* Gillespie, *supra* note 65; Langdon Winner, *Do Artifacts Have Politics?*, 109 DAEDALUS 121 (1980); Bruno Latour, *Which Politics for Which Artifacts?*, 871 DOMUS (2004), at https://www.domusweb.it/en/from-the-archive/2022/10/10/farewell-to-bruno-latour-one-of-the-greatest-french-intellectuals.html, [https://perma.cc/6NQU-6QVB].

[70] According to one reviewer: "Speed bumps are horrible. They may be necessary in some circumstances, but they are placed on far too many roads that are central arteries because the politics of them all favor supporting the local residents over the benefits of those passing through. This is often just another form of nimbyism. And even some of the benefits ("discourage cut-through traffic") impose their own costs in the form of worse traffic jams, which means lost time and more pollution." We agree with the basic point that there are tradeoffs and that *in some contexts* speed bumps can be horrible, overused, and counterproductive.

[71] *See, e.g.*, Ann Cavoukian & Mark Dixon, *Privacy and Security by Design: An Enterprise Architecture Approach* (Sep. 2013), https://www.ipc.on.ca/wp-content/uploads/Resources/pbd-privacy-and-security-by-design-oracle.pdf [https://perma.cc/S34Z-KHTG]; Intersoft Consulting, *Privacy by Design*, https://gdpr-info.eu/issues/privacy-by-design/ [https://perma.cc/9ZTD-9RNN] (last visite Jul. 20, 2023); Ann Cavoukian, *Privacy By Design: The 7 Foundational Principles* (Jan. 2011), https://iapp.org/media/pdf/resource_center/pbd_implement_7found_principles.pdf, [https://perma.cc/NH7Z-8DNN]; Reciprocity, *What Is Security By Design* (Mar. 7, 2020), https://reciprocity.com/resources/what-is-security-by-design/ [perma.cc/9QYZ-QAEU]. Beyond privacy and security, there are obviously many other types of decision making and values that can influence and be influenced by design. It might be more appropriate to group privacy-by-design and security-by-design under a broader umbrella, such as value-sensitive design. *See* Mary Flanagan, Daniel C. Howe & Helen Nissenbaum, *Embodying Values in Technology: Theory and Practice*, INFORMATION TECHNOLOGY AND MORAL PHILOSOPHY 322 (Jeroen van den Hoven & John Weckert eds., 2008); Batya Friedman & David G. Hendry, VALUE SENSITIVE DESIGN: SHAPING TECHNOLOGY WITH MORAL IMAGINATION (2019). Our research is not limited to any specific field or subfield.

computer science, and other disciplines, privacy- and security-by-design employ a variety of design-based interventions–not necessarily friction–to improve privacy and security decision-making for the benefit of the actor (subject, user) as well as others (community, public, society). Some such interventions involve friction with a functional purpose. For example, visceral notices, such as sound alerts when a camera takes a photo, are a type of friction that may increase the subject's privacy concern and initiate consideration of consequences.[72] Security researchers have shown that while a passive browser warning of a security risk–for example through a change in color on the screen–may fail to improve security, more active warnings that utilize friction to interrupt user experience and prompt action (active choosing) do help.[73]

The following parameters and associated questions are useful in comparing, evaluating, and designing friction-in-design examples and proposals.[74] We illustrate with the speed bump example.

1. *Type of friction*
   ○ *What is the source of the drag?*
   ○ *What forces and countervailing forces are in play?*
   ○ *What types of costs are created?*

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[72] *See* M. Ryan Calo, *Against Notice Skepticism in Privacy (and Elsewhere)*, 87 NOTRE DAME L. REV. 1027 (2013); Victoria Groom & M. Ryan Calo, *Reversing the Privacy Paradox: An Experimental Study*, TPRC (2011), https://ssrn.com/abstract=1993125 [https://perma.cc/K8RP-533S].

[73] Serge Egelman, Lorrie Cranor & Jason Hong, *You've Been Warned: An Empirical Study of the Effectiveness of Web Browser Phishing Warnings*, *in* Proceedings of the 2008 Conference on Human Factors in Computing Systems 1065 (April 2008), https://dl.acm.org/doi/10.1145/1357054.1357219 [https://perma.cc/4QC9-QLP2].

[74] The framework is flexible. Paul Ohm, Ayelet-Gordon-Tapiero, & Ashwin Ramaswami use the framework in their examination of the WhatsApp forwarding friction measure, which we discuss below. Paul Ohm, Ayelet-Gordon-Tapiero, & Ashwin Ramaswami, *Fact and Friction: Mandating Friction to Fight False News*, UC DAVIS L. REV. (forthcoming 2023). For example, they explain how some of the parameters can be grouped together: "The six categories are extremely insightful when conducting fine-grained analyses of friction, as well as when comparing different types of friction. In the following section we look at them together and inquire about the intended goals of various types of friction (Frischmann-Benesch parameter/factor 4), their implementation (1, 3, 5) and consequences (2). Additionally, we follow Frischmann and Benesch in adopting a broad perspective asking who it is that should determine when friction should be used and in order to promote what values (6)? What actor should be charged with deploying friction and assessing the advantages and costs it generates for its subjects and for society at large."

Speed bumps are physical road features that generate drag, reduction in speed, and physical impacts upon vehicles and occupants that depend on the vehicle, speed, and bump design. Those physical impacts may cause or directly constitute costs, whether passenger discomfort or damage to the vehicle.

2. *Direct effect of friction on subjects*
   ○ *How do subjects encounter and interact with the friction?*
   ○ *How does friction change subjects' actions, behavior, incentives, and opportunities?*

Subjects drive vehicles over speed bumps. In doing so, subjects may experience slight delays and variable physical impacts. What they experience depends on how they drive, and in particular, their speed. Those who drive "too" fast may experience greater costs and consequently may suffer regret. Anticipating such regret can lead subjects to undertake an anticipatory cost-benefit or expected utility calculation and consequently moderate their speeds. Put another way, speed bumps nudge subjects to internalize costs associated with speed, make a decision about speed moderation and route planning, and bear the consequences. In addition, subjects may be more likely to take account of other informational and contextual cues, such as the type of street or neighborhood, the design of the bump, and posted signs indicating appropriate speeds. Delays or discomfort from speed bumps also may cause subjects to consider alternative routes.

3. *Architectural design of friction*
   ○ *How does design generate friction?*
   ○ *What are the causal mechanisms?*

Speed bumps can be designed in many different ways to generate friction. For example, the shape of the bump may vary in terms of height, width, and curvature, and differences in those dimensions can impact the physical friction and different costs outlined above. Speed bumps also can vary in terms of material composition and aesthetics. Different colored bumps may provide notice and different signals to subjects. Signs also may provide notice of speed bumps.

4. *Purpose of friction; intended impact of friction:*
   ○ *What are the (un)intended (social) impacts of the friction?*

- *What are the relevant ends, social goals, or community objectives?*
- *Is the measure meant to encourage, discourage, or even disable certain activities or uses of shared resources?*[75]

Communities deploy speed bumps to serve the general social ends of safety and public order and to solve the specific problems of speeding and cut-through traffic on certain roads, usually residential streets. Notably, speed bumps do not substitute for other traffic management rules, such as speed limits, nor preclude police officers from issuing tickets to drivers who exceed such limits. Instead, speed bumps provide an additional means for managing traffic flows and shaping driver behavior.

Speed bumps are classified by transportation engineers as a "traffic calming" measure, where traffic calming refers to physical design and other measures aimed at reducing vehicular speeds and improving safety for other non-vehicular users of roads.[76] Critically, speed bumps are generally used on roads where there are both heterogeneous users (*e.g.*, vehicles and pedestrians) and interaction effects among users (*e.g.*, safety risks from one class of users for another). Such interaction effects often are a type of externality.[77] Drivers, especially non-resident drivers, may not fully appreciate the risks to others associated with their driving speed (*e.g.*, drivers may underestimate the likelihood of a pedestrian being in the roadway). People walking or biking, on the other hand, may appreciate the risks, but their only available response is to accept the risk to their safety or avoid using the road. Speed bumps can be an effective means for dealing with these interaction effects.

Communities deploy speed bumps when they are committed to multi-use management of roads. This is an important social value

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[75] There is considerable variation to consider. Mark Lemley suggests a useful distinction between friction-in-design measures imposed on everyone as a means to prohibit activities and friction-in-design measures that only impose delays designed to cause reflection but with no intent to stop considered decisions to engage in the activity. An example of the former would be efforts to prohibit underage drinking or drunk driving that depend upon friction-in-design measures (authentication, age verification, sobriety checkpoints) imposed on everyone. An example of the latter would be notice and consent mechanisms.

[76] *See, e.g.*, Ian Lockwood, *ITE Traffic Calming Definition*, ITE JOURNAL 22 , 22 (July 1997),; Institute of Transportation Engineers, *Traffic Calming, https://www.ite.org/technical-resources/traffic-calming/* [https://perma.cc/S5ZH-AVDP] (last visited Jul. 20, 2023).

[77] *See* Frischmann, *supra* note 27 (congestion chapter discussion of interaction effects).

to note. Speed bumps discourage speeding and encourage speed moderation by drivers and also afford people who aren't inside vehicles, such as pedestrians and cyclists, freedom to use the roads safely.[78] In addition to speed control, communities deploy speed bumps to deter cut-through traffic. Managing the volume of traffic also serves safety and public order goals.

5. *Scope of application*
   ○ *When does the design friction apply?*
   ○ *What conditions or behaviors trigger deployment of design friction?*

Once deployed, speed bumps often remain in place, in which case they are effectively always on (triggered), even if "the community activity around it that once made its presence worthwhile may shift in ways the speed bump cannot adjust to."[79] Temporary speed bumps, such as rubber ones that can be removed, provide a more flexible option for calming traffic. As noted below, municipalities generally decide on deployment.

6. *Governance*
   ○ *Who determines what values matter and how conflicts or tradeoffs among values should be resolved?*
   ○ *Who decides when and how to deploy and how to assess impacts?*

State and local governments govern deployment of most traffic calming measures, including speed bumps.[80] The processes

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[78] Other community values may include managing noise and the amount of traffic, as drivers may choose alternative routes.

[79] Gillespie, *supra* note 65, at 78.

[80] The PA DOT Traffic Calming Handbook provides some insight into local decision making about speed bumps. "Depending on the traffic problem that is being addressed, one of the following criteria should be considered:

> *Speeding*: When speeding is the primary concern, the 85th percentile speed should exceed 10 mph over the posted speed limit before traffic calming is considered. 85th percentile speed. (The 85th percentile speed is the speed at or below which 85 percent of the motorists on a street are traveling. This speed is often used as a measure of the upper limit of reasonable speeds for prevailing conditions.)

> *Cut-through*: When cut-through traffic is the primary issue, the cut-through traffic on the local residential street should be 40% or more of the total one hour, single direction volume. In addition, a minimum of 100 cut-through trips in one hour, in one direction, should be set as a minimum requirement.

for deciding when and how to deploy speed bumps and other traffic calming measures vary considerably across the United States. The Pennsylvania DOT, for example, outlines a multi-staged study and approval process that includes development of a local project ranking system; creation and engagement with a Local Traffic Advisory Committee; and a rigorous, empirically grounded study, planning, approval, installment, and evaluation process.[81] The PA DOT Traffic Calming Handbook emphasizes the importance of community engagement at the neighborhood level and notes that criteria used for determining speed and cut-through traffic problems "should be based upon local experience and preference."[82]

Like most regulatory measures and governance procedures, speed bumps also raise important distributive justice concerns. Speed bumps are a form of public investment, and so where those investments are made matters. Further, the impacts we have described may not be evenly distributed. Some people may benefit more than others; the costs may be distributed unevenly. Those who live in the neighborhood, for example, might reap most of the benefits while the costs are borne by those who live nearby (*e.g.* if traffic patterns shift).[83] As Tarleton Gillespie observes:

> *While our speed bump may not have the kind of racially charged impact that Winner's bridges may, it also discriminates, and in potentially consequential ways. It imposes more impact (literally) on those with lower quality*

This minimum criterion may need to be modified to better reflect local traffic conditions. Experience has shown that the speeding criteria of 10 mph over the posted speed may be higher than many municipalities consider acceptable and that a criteria of 5-7mph have been used in some municipalities." *See* PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF MAINTENANCE AND OPERATIONS (BOMO), Publication No. 383 PA TRAFFIC CALMING HANDBOOK ON THE WEB 1, 17 (2012) https://www.dot.state.pa.us/public/pubsforms/Publications/PUB%20383.pdf, [https://perma.cc/YD75-2PQ9].

[81] *See* PA Traffic Calming Handbook at p.17.

[82] *Id.*

[83] While it is beyond the scope of this paper, one way to appreciate and even empirically study the distributional issues might be to compare speed bumps and potholes across communities. Like speed bumps, potholes generate friction and may have similar consequences in terms of delay, physical impacts, and perhaps traffic calming. But potholes are unplanned and not attuned to community needs. While speed bumps generally reflect investment in a community to meet its needs, potholes generally reflect neglect. *C.f.* Justin Reich, *Street Bumps, Big Data, and Educational Inequality*, Education Week (March 01, 2013), available at https://www.edweek.org/education/opinion-street-bumps-big-data-and-educational-inequality/2013/03, [https://perma.cc/7ZT6-ZLVQ].

shock absorbers, which may mean those who can't afford expensive cars or costly repairs when their axles crack. It discriminates against bicycle riders, who are not speeding yet are forced to endure a more visceral impact than drivers who are. In a culture that has a deep love for cars and a matching disregard for public transportation, the fact that our chosen method of slowing down drivers also works against bicyclists could be seen as politically and economically significant. These discriminations may be minor, not rising to the level at which the technology itself needs to be reconsidered. But the speed bump also discriminates against those who have an urgent need, and legal permission, to exceed the speed limit: the ambulance rushing a sick patient to the hospital, the fire engine racing to a burning building. These uses are as constrained as all other forms of speeding, but they are of far greater consequence; here the speed bump actually works against a legal right and a societal need we would otherwise want to protect.[84]

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Consider another traffic management example that uses friction quite differently than a speedbump: the sobriety checkpoint. This is a type of roadblock, where a physical impediment blocks traffic temporarily to enable police officers to check on the sobriety of drivers. The checkpoint requires a complete stop. It is mandatory (not a nudge). It causes delays. It enables officers to elicit information from drivers. In other words, drivers must demonstrate that they are sober and thus entitled to use the shared resource. Interactions with police at checkpoints may cause other impacts, such as anxiety.[85] Checkpoints may aid police in catching drunk

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[84] Gillespie, *supra* note 65, at 77.

[85] Some people experience greater levels of anxiety than others, and not just because of concerns about sobriety. On anticipatory stress about police interactions, *see* Sirry Alang et al., *Police Encounters As Stressors: Association With Depression And Anxiety Across Race,* 7 SOCIUS 1 (Mar. 9, 2021). As with many other situations where police are capable of exercising power, there are serious concerns about abuse of such power, selective enforcement, racial and other forms of discrimination. *See, e.g.*, Rose M. C. Kagawa, et al., *Racial bias and DUI enforcement: Comparing conviction rates with frequency of behavior,* 20 CRIMINOLOGY & PUBLIC POLICY. (October 2021); Emma Pierson et al., *A large-scale analysis of racial disparities in police stops across the United States,* 4 NATURE HUMAN BEHAVIOUR, 736 (May 4, 2020); Ronald Weitzer & Steven A. Tuch, 83 *Racially biased policing: Determinants of citizen perceptions,* SOCIAL

drivers, but they may be more effective as deterrents, provided there is sufficient public notice of the practice.[86] For brevity, we do not fully examine checkpoints. We note, however, that while checkpoints may not initially seem like friction-in-design because they involve the police, the roadblock generates friction by slowing and stopping traffic temporarily to prompt communication, deliberation, and evaluation. The mechanisms, purposes, and consequences are quite different from the speed bump. [87] But checkpoints are architectural sources of friction-in-design nonetheless. As we shall see, CAPTCHAs, passwords, and other digital authentication measures are more like checkpoints and breathalyzer-controlled ignitions[88] than speed bumps.[89]

There are countless examples of friction-in-design we could examine using these parameters and associated questions. Doing so would reveal variance and nuance in measures, mechanisms, behaviors, and social goals. Friction-in-design measures are such an ordinary feature of our everyday experience offline that we easily

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FORCES 1009 (Mar. 2005); Stewart J. D'Alessio, & Lisa Stolzenberg, 81 *Race and the probability of arrest,* SOCIAL FORCES 1381 (Jun. 2003)

[86] *See, e.g.*, Randy W. Elder, Ruth A. Shults, David A. Sleet, James L. Nichols, Stephanie Zaza & Robert S. Thompson, *Effectiveness of Sobriety Checkpoints for Reducing Alcohol-Involved Crashes,* 3 TRAFFIC INJURY PREVENTION 266 (Sep. 15, 2002); James C. Fell, John H. Lacey & Robert B. Voas, *Sobriety Checkpoints: Evidence of Effectiveness Is Strong, but Use Is Limited*, 5 TRAFFIC INJURY PREVENTION 220 (Aug 11, 2004),.

[87] One of the reasons we develop the descriptive framework is to promote comparative evaluation of different friction-in-design measures. The differences matter. As one reviewer suggested, it seems a speedbump only imposes friction that can be surmounted, but checkpoints and other friction-in-design measures that use friction instrumentally for authentication and verification of age, identity, and sobriety (among other things) also may implement prohibitions (no drinking, voting, or driving unless one qualifies), and the latter may raise special concerns about enforcement, false positive and negatives, and other governance concerns. We appreciate the point. Of course, speedbumps also can implement prohibitions (no drag racing) and raise governance concerns.

[88] Juliana Shulman-Laniel, Jon S. Vernick, Beth McGinty, Shannon Frattaroli & Lainie Rutkow, *U.S. State Ignition Interlock Laws for Alcohol Impaired Driving Prevention: A 50 State Survey and Analysis*, 45 J.L. MED. & ETHICS 221 (2017).

[89] In *Governance Seams*, Frischmann and Ohm explain how CAPTCHAs utilize friction-in-design to create a governance seam. *See* Brett Frischmann and Paul Ohm, *Governance Seams*, HARV. J.L. TECH (forthcoming 2023). "CAPTCHAs govern behavior at an important interface (the relevant seam), create friction with a functional purpose (authentication), and enable governance in the enforcement of a membership rule (humans allowed, bots not allowed).". They also explain why speed bumps "do not involve a seam or *enable governance*. Rather, speed bumps are architectural features of roads that *directly govern* use of shared roads, using friction-in-design to 'nudge subjects to internalize costs associated with speed, make a decision about speed moderation and route planning, and bear the consequences.'" *Id.* at 9 [draft] (quoting this paper).

can take for granted the knowledge systems that shape, and institutional systems that govern, their deployment, and their beneficial effects.[90] Our claim is not that all friction-in-design measures are governed well, the same, or even at all. Our point is simply that friction-in-design is ubiquitous and often subject to (sometimes obscure) governance.

Consider a familiar example of friction-in-design from the digital networked world–the CAPTCHA, which stands for Completely Automated Public Turing Test to Tell Computers and

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[90] Notably, friction-in-design measures are components of techno-social systems. For a similar view, see Tarleton Gillespie, *supra* note 65 ("To understand the regulation of human activity imposed by a bridge, a speed bump, or a DRM encryption system, we need to look not simply at the technological edge of that regulation and what its political consequences may be, but at the heterogeneous network of elements it represents, how they together regulate activity (more than the technology could ever do by itself), and, most important, how these elements are being held together, by whom, and against what challenges.").

Humans Apart.[91] CAPTCHAs require a user to perform a task, such as image classification, prior to accessing a website in order to make sure a user is a human being and not a bot. This is a type of authentication procedure. Notably, there are many different implementations of CAPTCHAs. There are many types of tasks that humans can perform to reliably prove that they are human and not a software bot. Some of these tasks are simple; some are complex. Some tasks require instructions, and others do not since they are intuitive or easy for humans to grasp. Some tasks are only good for authentication; other tasks serve that purpose and generate useful

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[91] Captcha, http://www.captcha.net (last visited Aug. 1, 2022).

data.[92] CAPTCHAs generally work well, although by no means perfectly. Users do not love the extra work but (have learned to) tolerate the friction as a necessary security measure.[93] And the arms race between CAPTCHAs and attackers continues.[94] Our main point is simple: CAPTCHAs are a digital cousin to speed bumps.[95] We summarize the analysis of CAPTCHAs using the six parameters and questions in the following chart:

CAPTCHAs	
Type(s) of friction	Architectural feature of website, app, or human-computer interface that blocks access until a task is performed effectively (test passed).
Direct effect(s) of friction on subjects	Time delay; delayed or reduced access to system, resource, or content; prompt deliberation about whether to perform the task; prompt action / labor associated with task performance; cause annoyance and/or fatigue.[96]

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[92] Notably, authentication itself can serve different ends.

[93] We have not yet found a study evaluating user opinions about or behavior when encountering CAPTCHAs. The security measure is widespread and does not seem to overburden people so much that they switch activities. In other situations (*e.g.*, cookie consent mechanisms), fatigue and frustration may be more prevalent than toleration. We suspect user responses vary in part based on whether and how well they understand the reasons for the friction and, in some cases, on their own assessment of those reasons. In some contexts, friction-in-design might need to serve a teaching function that helps users appreciate the reasons for friction. *See* Sarah Michele Rajtmajer & Brett Frischmann, *Pedagogical Friction-In-Design of Privacy-Enhancing Technologies, E-Contracting Interfaces, and Password Security Tools* (Working Paper, 2023) (on file with the author).

[94] *See* Nghia Trong Dinh & Vinh Truong Hoang, *Recent Advances of Captcha Security Analysis: A Short Literature Review*, 218 PROCEDIA COMPUTER SCI. 2550 (2023).

[95] CAPTCHAs, passwords, and other authentication measures may be more analogous (and thus closer relatives) to the sobriety checkpoint than a speed bump. Bear in mind that metaphors are necessarily partial. *See, e.g.*, Brett M. Frischmann, *The Prospect of Reconciling Internet and Cyberspace*, 35 LOY. U. CHI. LJ. 205 (2003).

[96] These friction effects may have a disproportionate impact on certain groups, including people with visual or cognitive disabilities, and in such cases may prevent access entirely. *See e.g.,* World Wide Web Consortium (W3C), *Inaccessibility of CAPTCHA: Alternatives to Visual Turing Tests on the Web*, (Dec. 16 2021), https://www.w3.org/TR/turingtest/, [https://perma.cc/UHT9-UQ6J]. Moreover, some people will not access the resource at all. More than just delay, the friction can lead some people to give up.

Architectural design of friction	Software code; human-computer interface design. Task performance requires coded interactions.
Purposes of friction; (un)intended (social) impacts of friction	Generate reliable evidence (proof) that a user is human and not a bot; enable security measures (when test is not passed and bot is detected); generate data from task performance.[97]
Scope of application	Authentication process; applies upon initial access; owner or system manager decides on whether to deploy.
Governance	Owners and operators of websites, apps, or other human-computer interfaces choose whether and how to deploy CAPTCHAs. There are many different implementations, some openly accessible and others proprietary. Governance of data collected as a result of task performance may be controlled by the CAPTCHA service provider.

Another familiar authentication procedure is the use of passwords prior to obtaining access to a resource or system. Password procedures involve a different type of friction-in-design than CAPTCHAs and for different purposes. Passwords are a knowledge-based means of authentication.[98] Knowledge of a password serves as a proxy for identification in a system designed

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[97] These functional purposes can serve other social ends, like supporting the formation of online communities. *See* Ohm & Frankle, *supra* note 35, p. 36 ("In many cases, captchas make forming communities online possible by filtering out robots that would otherwise fill discussion forums with spam or even overload websites with fake traffic."). The data generated by CAPTCHAs also can be quite valuable, especially when aggregated across many users. This raises an additional set of governance concerns. *See, e.g.*, Katharine Schwab, *Google's New reCaptcha Has A Dark Side*, FAST COMPANY (June 27, 2019), https://www.fastcompany.com/90369697/googles-new-recaptcha-has-a-dark-side [https://perma.cc/428Y-5F3M].

[98] CAPTCHAs are task- or performance-based means for authentication. CAPTCHAs demonstrate that the user is a human and not a bot. Passwords do not perform this authentication function. That is, providing a password does not demonstrate that a user (password provider) is a human and not a bot.

to control access. Other than providing the password, there is no task to perform. Yet there is still friction. There is the time delay associated with entering the password. It is an extra step and a slight delay. Friction in the form of a time delay also occurs if one enters an incorrect password, and the length of the timeout can increase progressively, even exponentially, with each incorrect guess. Finally, setting up the username and password in the first instance can be taxing, especially when password composition rules, password security meters, and security precautions, like not reusing passwords, are considered.[99]

Companies also employ friction-in-design strategically to serve the companies' interests. For example, Frischmann examines the asymmetric use of friction-in-design in the iPhone geolocation services settings to set users on the engineered path of least resistance to always-on geolocation tracking.[100]

> *The geolocation tracking control on an iPhone presents a simple nudge. To turn on tracking, one touches a single button. That's it. You see a green colored button, which suggests: Safe, go ahead. To turn off tracking, a person (i) touches a button, (ii) receives a message informing (warning) that location services will be disabled for all apps, and then (iii) must touch the red 'Turn Off' text to confirm one's decision. The red color suggests: Warning, stop, danger. The asymmetrical use of friction is unambiguous. It leverages two of the most common dark patterns: aesthetic manipulation (e.g., green versus red coloring) and obstruction (differential effort) (Grassl et al. 2020). A slippery slide in one direction and a steep climb in the other. The data-driven design of choice architecture steers users toward a particular result but leaves it up to them. Basically, the nudge encourages users to turn and leave on geolocation tracking as a default because it enables*

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[99] We could say much more about password security and friction-in-design. The initial password creation process involves friction that can be more or less productive. Password composition rules, for example, can be designed to have more friction in order to teach password security, or they can be more instrumentally focused on streamlining creation of supposedly strong passwords. *See, e.g.*, Brett Frischmann & Alexandria Johnson, *Common Nonsense about Password Security and the Expert-Layperson Knowledge Gap*, *in* GOVERNING MISINFORMATION IN EVERYDAY KNOWLEDGE COMMONS (Madelyn Rose Sanfilippo and Melissa Ocepek, eds.,, forthcoming 2023). Friction is also important for security. For example, when someone enters the wrong password, imposing a time delay between password guesses is an important friction-in-design measure that trades off convenience for security.

[100] Brett Frischmann, *Nudging Humans*, 36 SOCIAL EPISTEMOLOGY 129-52 (Oct. 2021).

various apps to collect data and function without further involvement of the user. The default is 'sticky' – once chosen, people tend to stick with it.[101]

The friction-in-design is asymmetric in the sense that friction in the form of multiple steps, red colored terms, and text warnings only manifests on the path towards privacy (opting out of tracking). The path that leads to always-on tracking is frictionless. Fortunately, Apple has made some changes to its interface design that enable users to make more fine-grained, app-specific decisions about whether to grant an app access to geolocation data. The interface design described above remains for managing all geolocation services at once, but there is additional friction-in-design that prompts the user and provides salient information before granting access to geolocation data for specific apps.

iPhone geolocation services settings	
Type(s) of friction	Human-computer interface design features that generate drag only when the subject turns off geolocation tracking. Features include a required extra step, red colored terms, and text warnings.
Direct effect(s) of friction on subjects	Time delay; deliberation about whether to perform the task (turn off tracking); prompt cognitive association of task performance with red color; prompt reading of small text in warning.
Architectural design of friction	Software code; human-computer interface design; aesthetic design. Task performance requires coded interactions on smartphone screen.
Purposes of friction; (un)intended (social) impacts of friction	Make turning geolocation tracking off more costly than turning the tracking on. Nudge users towards default of always-on geolocation tracking.

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[101] *Id.* (citing Paul Grassl et al., *Dark and Bright Patterns in Cookie Consent Requests*, (PsyArXiv, Jul. 21, 2020)), https://doi.org/10.31234/osf.io/gqs5h [https://perma.cc/JY5V-JD3T]).

Scope of application	Applies only when the subject opens Settings and is making a decision about geolocation tracking. May lead to a sticky default.
Governance	Private. Apple decides.

Many other examples are familiar: think about what you have to go through to cancel an order or remove your name from a mailing list.[102] Friction-in-design can be used strategically to fatigue consumers and raise impediments to behaviors that challenge business models. Sometimes, these designs qualify as so-called dark patterns, but not always.[103] The iPhone example just given is not necessarily a dark pattern.[104] Unless such design constitutes an unfair or deceptive business practice and triggers scrutiny by the FTC,[105] these practices face little regulatory oversight. This is an area where friction-in-design regulation could develop to require friction in some cases but limit its strategic or asymmetric use in others.[106]

Some companies have tried to use friction-in-design to achieve social ends. We present a few examples to illustrate what is possible and worth exploring as potential friction-in-design regulation.

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[102] On "roach motel" dark patterns, *see* Jamie Luguri and Lior Jacob Strahilevitz, *Shining a Light on Dark Patterns*, 13 JOURNAL OF LEGAL ANALYSIS 43 (2021).

[103] Dark patterns "'are user interface design choices that benefit an online service by coercing, steering, or deceiving users into making unintended and potentially harmful decisions" Mathur, Arunesh et al., *Dark Patterns at Scale: Findings from a Crawl of 11K Shopping Websites*, 3 Proc. ACM Hum.-Comput. Interact. 81:1 (Nov. 2019) https://arxiv.org/pdf/1907.07032.pdf [https://perma.cc/4ZZV-E8GM].

[104] "*Why not?* First, the design does not coerce or deceive; it does steer the user in a direction. But that steering is not deceptive or hidden, nor does it lead to unintended decisions. Second, transaction cost analysis provides a justification. The nudge can reduce transactions costs and serve *an* interest of users. This imperfect nudge falls neatly into the gray area that escapes scrutiny. And that's the problem." Brett Frischmann, Nudging Humans, 36 SOCIAL EPISTEMOLOGY 129, 136 (Oct. 2021). But *see* Federal Trade Commission, *Staff Report: Bringing Dark Patterns to Light* (Sept. 2022), https://www.ftc.gov/reports/bringing-dark-patterns-light [https://perma.cc/BYW6-YCMF] (developing broader taxonomy of dark patterns including design elements that obscure or subvert privacy choices).

[105] *See* 15 U.S.C. Section 5 (prohibiting "unfair or deceptive acts or practices in or affecting commerce").

[106] *See* Lauren E. Willis, *Performance-Based Remedies: Ordering Firms to Eradicate Their Own Fraud*, 80 LAW & CONTEMPT. PROBS. 7 (2017); Lauren E. Willis, *Performance-Based Consumer Law*, 82 U. CHI. L. REV.. 1309, 1311 (2015).

WhatsApp implemented the following friction-in-design in India initially, after a series of gruesome lynchings in 2017 and 2018 in response to false allegations of child kidnapping that circulated virally on the platform.[107] The company later extended the policy worldwide. Messages that have been "forwarded many times" (5 or more forwards) could only be forwarded to one user or group at a time. WhatsApp reported that the spread of "highly forwarded" messages dropped 70% after instituting this restriction.[108] Then in 2020, after false rumors linked COVID-19 to 5G mobile networks and people began setting fire to cell phone masts in the UK, WhatsApp tightened the restriction further, to allow users to share frequently forwarded content with only one chat at a time.[109] The friction takes the form of a delay, extra steps, and effort to reach a larger audience. It applies to all messages and is thus content neutral. The purpose of the friction is to reduce the spread of misinformation and foster personal conversations rather than mass distribution.[110]

Twitter has implemented a series of friction-in-design measures that are also meant to inhibit the spread of disinformation on its platform. As the company puts it, "To help promote informed discussion, when you Retweet an article that you haven't opened on Twitter, we may ask if you'd like to open it first."[111] Twitter reports that the friction associated with the prompt led to more reading before retweeting.[112]

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[107] *See* Alex Hern, *WhatsApp To Restrict Message Forwarding After India Mob Lynchings*, THE GUARDIAN (July 20, 2018) https://www.theguardian.com/technology/2018/jul/20/whatsapp-to-limit-message-forwarding-after-india-mob-lynchings [https://perma.cc/Z3AL-6JMV]. Philipe de Freitas Melo et al., *Can WhatsApp Counter Misinformation by Limiting Message Forwarding?*, 8 INT'L CONF. COMPLEX NETWORKS & APPS, 372, 378 (2019).

[108] Jon Porter, *WhatsApp Says its Forwarding Limits Have Cut The Spread of Viral Messages by 70 Percent,* THE VERGE (Apr. 27, 2020), https://www.theverge.com/2020/4/27/21238082/whatsapp-forward-message-limits-viral-misinformation-decline [https://perma.cc/NVZ3-RDBY].

[109] Ryan Browne, *WhatsApp Tightens Message Forwarding Restrictions to Combat Coronavirus Misinformation*, CNBC (April 7, 2020, 5:51 AM), www.cnbc.com/2020/04/07/whatsapp-limits-message-forwards-to-combat-coronavirus-misinformation.html [https://perma.cc/T2SL-7EAR].

[110] For a thorough examination of the fast-forwarding restriction, how it is coded, and work-arounds, *see* Ohm et al., *supra note 74.*

[111] James Vincent, Twitter is bringing its 'read before you retweet' prompt to all users, THE VERGE (Sep. 25, 2020) https://www.theverge.com/2020/9/25/21455635/twitter-read-before-you-tweet-article-prompt-rolling-out-globally-soon, [https://perma.cc/F7GZ-6SB2].

[112] *Id.*

Other companies are also experimenting with prompts and alert messages. Depending on the message and context, these digital speed bumps may generate deliberation and consideration of whether and how to proceed. Consider, for example, the following generic "sensitive content" warning on TikTok. Along with the warning, the red colored default nudges the user toward skipping the video.[113] But other users may well be *more* likely to watch the video after seeing the warning. This is an example of an intervention that must be robustly studied, to learn what its actual effects are. Without such study – and publicly available reports of the findings – companies are groping in the dark when they attempt to favorably influence human behavior, and legislators would be doing the same.
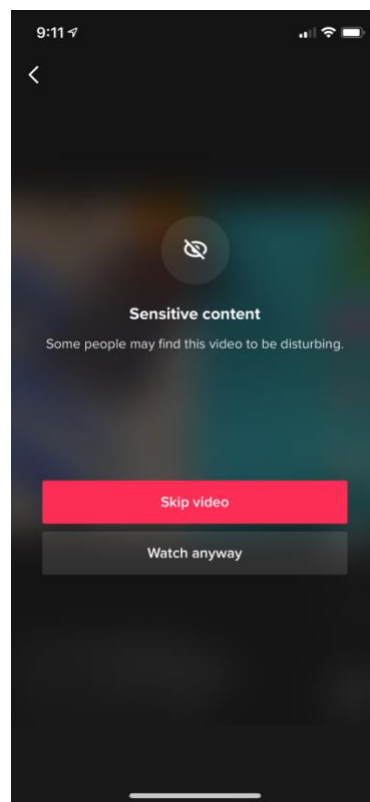
A recent study by Ofcom, the UK's communications regulator, describes various other examples, ranging from (i) social

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[113] Cormac Keenan, *Refreshing our policies to support community well-being*, TikTok Newsroom (Dec 15, 2020), https://newsroom.tiktok.com/en-us/refreshing-our-policies-to-support-community-well-being, [https://perma.cc/CW7S-NCX7]. *See also* Ofcom, *Behavioural insights for online safety: understanding the impact of video sharing platform (VSP) design on user behaviour*, Economic Discussion Paper Series (2ed., July 23), https://www.ofcom.org.uk/__data/assets/pdf_file/0022/241834/EDP-Behavioural-insights-for-online-safety.pdf, [https://perma.cc/ESQ4-JUZB].

proof alert messages on YouTube that let a user know that "the YouTube community" has identified the content as offensive to some audiences to (ii) alert messages on Twitter that inform users that content shared in a Tweet is "disputed and may be misleading about how to participate in an election or other civic process."[114]

It is encouraging that some companies are experimenting with friction-in-design for social good. Which types they choose to try, reveal, use, and so on is not, however, part of an inclusive public conversation, nor are they studying the effects of the interventions and publishing the results, which is vital for building knowledge on how to use friction-in-design effectively, as mentioned above. Instead, the companies decide privately which methods to try, in an unregulated environment and without oversight in the public interest. Accordingly, while examples provide some useful ideas about what's possible, the list of private interventions does not come remotely close to revealing the full regulatory territory, nor is it clear, without publicly accessible research on the effects of such interventions, what impact they have, if any, on information disorder. For that we need to think and act more broadly. We return to that task in Part IV.

In this section, we explained what friction-in-design is, proposed a simple framework for analyzing friction-in-design measures, and discussed a few examples[115]. We now turn our attention to friction-in-design regulation.

B. Friction-in-design Regulation

Friction-in-design regulation is not new. Some familiar examples include:

- *Product labeling laws that require the disclosure of salient information for a consumer to take into account when*

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[114] Ofcom, *supra* note 113.
[115] Not all platform interventions constitute friction-in-design, even when they add friction. For example, one reviewer asked whether certain types of content moderation, such as shadowbanning or removing links from search results, would qualify as friction-in-design since these actions would increase the costs of finding specific content (or being found). Our preliminary take is that the actions might generate friction but not qualify as friction-in-design, at least in so far as the actions are not design features. This is a topic Frischmann and Ohm explore elsewhere. *See* Brett Frischmann & Paul Ohm, *How friction-in-design moderates, amplifies, and dictates speech and conduct*, Optimizing for What? Algorithmic Amplification and Society (draft on file with authors).

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making a purchasing decision.[116] *Such laws may require companies to display specific information about ingredients, and even warnings against the contents of a package, to catch the consumer's attention and prompt deliberation.*[117]

- *Laws that require verifying a person's age or identity prior to admission to a building (e.g., a bar) or a voting booth.*[118]
- *Building codes, land use regulations, and various other laws focused on architectural systems require design features that introduce friction for purposes that serve social ends of safety and public order.*
- *Public assembly permitting laws that, among other things, require authentication by organizers, for example, by advance submission of an application that collects information about the organizers and plans for the event.*[119]
- *Laws that limit the locations where people may engage in public protest, to keep them a minimum distance away from other people, even though the protestors usually want to capture the attention of those people.*

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[116] *See, e.g.*, Regulations Under Section 4 of the Fair Packaging and Label Act, 16 C.F.R. Part 500, https://www.ftc.gov/legal-library/browse/rules/fair-packaging-labeling-act-regulations-under-section-4-fair-packaging-labeling-act, [https://perma.cc/TKM5-9L3Q]; Jennifer L. Pomeranz et al., *Mandating Front-of-Package Food Labels in the U.S. - What are the First Amendment Obstacles?*, 86 FOOD POLICY 1 (July, 2019), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7441739/. [https://perma.cc/QG9R-2L2C]

[117] The effectiveness of mere disclosure both as a source of friction and as a means for achieving social goals (*e.g.*, consumer autonomy, informed decision-making, fairness) is hotly contested. Not only are disclosures easily ignored, but they can have the opposite of the intended effect by serving a moral licensing function. We do not wade into the debate about disclosure. We recognize that mere disclosure, like *shallow transparency*, is usually insufficient. *See* Brett Frischmann, Michael Madison, & Madelyn Sanfilippo, GOVERNING SMART CITIES AS KNOWLEDGE COMMONS 309-320 (2023) (exploring shallow versus deep transparency). What that means, for our purposes, is that disclosure can be an important component of a friction-in-design measure, but usually it is not enough on its own. *See* OMRI BEN-SHAHAR & CARL E. SCHNEIDER, MORE THAN YOU WANTED TO KNOW: THE FAILURE OF MANDATED DISCLOSURE (2014); CASS R. SUNSTEIN, TOO MUCH INFORMATION: UNDERSTANDING WHAT YOU DON'T WANT TO KNOW 79–80 (2020); Florencia Marotta-Wurgler, *Even More Than You Wanted To Know About The Failure Of Disclosure*, 11 JERUSALEM REV. LEGAL STUD. 63, 64 (2015).

[118] *See, e.g.*, Department of Justice, *The National Voter Registration Act of 1993 (NVRA)* (last updated July 20, 2022), https://www.justice.gov/crt/national-voter-registration-act-1993-nvra [https://perma.cc/9KDE-7LS5]

[119] *See, e.g.*, The City of San Diego, SPECIAL EVENT PLANNING GUIDE, https://www.sandiego.gov/sites/default/files/legacy/specialevents/pdf/planningguide.pdf [https://perma.cc/Y2QT-PKR7].

Friction-in-design regulation means regulation by the state that either directly requires friction-in-design measures or requires certain functional outcomes that are best achieved by friction-in-design measures even though such measures are not specifically required.[120] At this stage, we are agnostic about what the state action might be or who is the relevant state actor. Thus, for purposes of analysis, we might assume Congress passes a law. Or it could be a state legislature, or it could be FTC, FCC, FDA, or another regulatory agency, depending on the context.

For digital networked society, friction-in-design regulation means state regulation *of* code, architecture, or interface design. It is regulation that requires friction with a functional purpose. The types of friction vary, according to context, what specifically is being regulated, and the state (regulatory) purposes. Friction-in-design regulation can require virtual speedbumps that cause delays, slow down interactions, and require work (labor, task performance, thinking, deliberation, etc.). Friction-in-design regulation may involve nudging or other forms of social engineering, but that will not always be the case, as the checkpoint discussion above demonstrated.[121]

The governmental regulatory purposes vary by context as well, but generally should be familiar social values. Of course, what those values are and how they may factor into different analyses are contestable and something we will discuss below (and more extensively elsewhere). For now, we acknowledge that we lean in the direction of recognizing the social value of sustaining basic capabilities essential to human flourishing, including the exercise

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[120] Some readers might get stuck on the idea that friction-in-design, like all architecture, necessarily regulates and thus is necessarily a form of regulation. *See* Joel Reidenberg, *Lex informatica: The formulation of information policy rules through technology*. 76 TEX. L. REV. 553 (1997); Lawrence Lessig, CODE: AND OTHER LAWS OF CYBERSPACE (1998); Patricia Bellia, Paul Berman, Brett Frischmann & David Post, CYBERLAW: PROBLEMS OF POLICY AND JURISPRUDENCE IN THE INFORMATION AGE (5th edition, 2017). We understand the impulse, and frankly, have gone down that road before ourselves in other work. *See, e.g.*, *id.* (examining architecture as a form of regulation). But here we prefer to maintain a distinction between friction-in-design and friction-in-design regulation. The distinction we maintain is simple. The former does not require state action; the latter does. Of course, friction-in-design is something private companies choose to implement on their own. Some in fact do so, sometimes for the social good but also sometimes for their own interests, *see, e.g.*, geolocation privacy settings interface design in an iPhone that uses asymmetric design friction in favor of always on tracking. More often, however, design aims to minimize friction. For various reasons, market incentives steer away from friction.

[121] *See supra* text accompanying notes 85-88.

and cultivation of free will, autonomy, and sociality.[122] As noted above, humans require friction: We need time and opportunities to think, to exercise our free will, to relate to others, to establish trust and cultivate meaningful relationships, and even to effectively govern ourselves and civil communities.

We recognize that framing our normative analysis and justification for friction-in-design regulation in terms of capabilities essential to human flourishing will strike many readers as too abstract and disconnected from more typical public policy analyses and legal and political debates. This may seem to present a challenge, but it is not one we feel compelled to take on in this paper, for a few reasons. First, it requires a much more extensive discussion than appropriate for this law review article.[123] Second, such a discussion would pull us away from our central thesis and main contributions, which center on the idea of opening the regulatory possibility space to encompass friction-in-design regulation. Third, evaluation of any friction-in-design regulation proposal will necessarily be contextual. There is no need to debate in abstract terms about how various social values should be articulated, measured, weighted, and traded off against each other. Finally, as we discuss in the next Part, the First Amendment supplies guidance on how to evaluate the normative justifications for friction-in-design regulation. Essentially, the compelling (significant) government interest, the least restrictive (narrow tailoring), and content neutrality standards provide important constraints.

The digital networked world is littered with disinformation and other content that leads to political polarization and information

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[122] *See* Frischmann & Selinger, *supra* note 2. Frischmann and Selinger focus on these capabilities. For a broader account of capabilities and human flourishing, *see* Amartya Sen, *Human Rights and Capabilities,* 6 JOURNAL OF HUMAN DEVELOPMENT 151 (2005); AMARTYA SEN, COMMODITIES AND CAPABILITIES (1985); AMARTYA SEN, DEVELOPMENT AS FREEDOM (1999); SABINA ALKIRE, VALUING FREEDOMS: SEN'S CAPABILITY APPROACH AND POVERTY REDUCTION (2002); MARTHA NUSSBAUM & AMARTYA SEN, THE QUALITY OF LIFE (1993); Martha Nussbaum, CREATING CAPABILITIES: THE HUMAN DEVELOPMENT APPROACH (2013).

[123] In Part I, we set forth an abbreviated account of why digital networked society needs friction-in-design regulation. For a full account, *see* Frischmann & Selinger, Re-Engineering Humanity, *supra* note 2. Simply put, we've raced too quickly and too far down the path toward a digital networked world engineered to be as friction-free as possible. We described humanity's techno-social dilemma and the logics and design mantras that shape the slippery sloped path we're on. Other scholars have captured related phenomena and aspects of the dilemma. For example, Shoshana Zuboff focuses on surveillance capitalism, and Julie Cohen on information governance and managerialism. *See* Zuboff, *supra* note 23, and Julie E. Cohen, BETWEEN TRUTH AND POWER: THE LEGAL CONSTRUCTIONS OF INFORMATIONAL CAPITALISM (2019).

disorder. [124] Social interdependence is at an all-time high; externalities are pervasive. [125] There is tremendous social demand for governance, and it is increasingly clear that relying on markets or big tech platforms to supply the governance society needs is a terrible mistake. [126] As discussed in Part I, antitrust, consumer protection, and privacy laws may be necessary, but they are woefully insufficient.

We contend that friction-in-design regulation deserves more serious, systematic attention by interdisciplinary scholars and policymakers. Unfortunately, the First Amendment quashes many regulatory proposals and even regulatory imagination,[127] and that preemptive effect may be especially strong in this case because friction-in-design would focus on code, architecture, and interface design. [128] Imagine, for example, legislation that required private companies to implement forwarding friction, screen time alerts, grayscale phone settings, or alerts prior to content sharing.[129] Such

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[124] Ironically, more people have access to abundant knowledge and communications capabilities than ever in human history, yet one may reasonably ask whether, with such abundance, people have become more knowledgeable and capable. *See* Brett M. Frischmann & Giovanni B. Ramello, *Externalities, scarcity, and abundance*, 7 FRONT. RES. METR. ANAL. 1 (Jan 11, 2023).

[125] For a more detailed exploration of this hypothesis, *see id.*

[126] *But c.f.* Kate Klonick, Big Speech (draft on file with authors 2023) (exploring how Big Speech platforms supply various forms of governance and likely do so more effectively than would smaller platforms).

[127] *See supra* sources cited in notes 8 and 9. *See* also Rachel Proctor May, *Punitive Preemption and The First Amendment*, 55 SAN DIEGO L. REV. 1 (2018)**;** *The Deregulatory First Amendment at Work,* 51 HARV. C.R. -C.L. L. REV. 323 (2016).

[128] *See* Alan Z. Rozenshtein, Silicon Valley's Speech: Technology Giants and the Deregulatory First Amendment, 1 JOURNAL OF FREE SPEECH LAW 337, 340 (2021), collecting the following representative sources: Woodrow Hartzog & Neil Richards, *Privacy's Constitutional Moment and the Limits of Data Protection*, 61 B.C.L. REV. 1687, 1731 (2020); James Grimmelmann, *Speech Engines,* 98 MINN. L. REV. 868 (2014); Jeff Kosseff, *First Amendment Protection for Online Platforms*, 2 COMP. L. & SEC. REV. 199 (2019); Madeline Lamo & Ryan Calo, *Regulating Bot Speech*, 66 UCLA L. REV. 988 (2019); Toni M. Massaro & Helen Norton, *Siri-ously? Free Speech Rights and Artificial Intelligence*, 110 NW. U. L. REV. 1169 (2016); Tim Wu, *Machine Speech*, 161 U. PA. L. REV. 1495 (2013).

[129] Recently, Senators Amy Klobuchar (D-MN) and Cynthia Lummis (R-WY) introduced the Nudging Users to Drive Good Experiences on Social Media Act, which proposes a few examples of friction-in-design regulation. For example, the bill recognizes a series of content-agnostic interventions on social media platforms, such as screen time alerts, grayscale phone settings, labels and alerts prior to content sharing, and directs the NSF to support research about such interventions. The bill also envisions the FTC engaging in notice and comment rulemaking to generate friction-in-design regulations based on the research. Notably, Ellen Goodman suggested that the content-agnostic interventions would not likely survive a First Amendment challenge. *See* Ellen Goodman, *Assessing*

legislation, if it ever passed, would immediately be subject to legal challenge on First Amendment grounds, and on prevailing views of the First Amendment, the legislation would be subject to strict scrutiny and likely struck down.[130]

However, there may be a solution. It involves challenging those prevailing views and careful crafting and legislative drafting of friction-in-design regulation. In the next Part, we explain how friction-in-design regulation should be a form of content-neutral time, place, and manner restriction that receives intermediate scrutiny, rather than strict scrutiny. This analysis also leads to a new governance theory for the online world grounded in tpm theory and jurisprudence.

III. FIRST AMENDMENT ANALYSIS: TIME, PLACE, AND MANNER

The First Amendment has often been seen as a barrier to regulating private companies' governance of life online. The relevant case law does bar government from legislating content moderation i.e. indicating what content companies should remove or otherwise disfavor, since such regulations would be content-specific and therefore subject to strict scrutiny. However, there are many opportunities for friction-in-design regulation that are content-neutral and should therefore pass First Amendment muster. As Kyle Langvardt has pointed out in an article arguing, as we do here, that the First Amendment should not bar regulation of private companies' governance of online behavior, the companies might try to fend off regulation by arguing that their decisions regarding platform architecture, algorithms, and systems are themselves a form of speech protected by the First Amendment.[131] Though there are cases recognizing some features of software as speech,[132] protection cannot be credibly extended to all decisions by private companies regarding the use of digital technologies.

The basic task, illustrated by the overlapping part of the two circles in the diagram below, is to identify friction-in-design regulation that also qualifies as content neutral time, place, and manner restriction. As we explore in this Part, it is well-established in First Amendment jurisprudence that government may impose

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the Nudge Act (2022), https://techpolicy.press/assessing-the-nudge-act/ [https://perma.cc/SAH4-3E78]

[130] *See infra* Part III.

[131] Langvardt, *supra* note 8.; Langvardt, *supra* note 10.

[132] *Id.*

reasonable restrictions on the time, place, or manner of protected speech, provided the restrictions "are justified without reference to the content of the regulated speech, that they are narrowly tailored to serve a significant governmental interest, and that they leave open ample alternative channels for communication of the information."[133]

friction-in-design

content neutral tpm restrictions
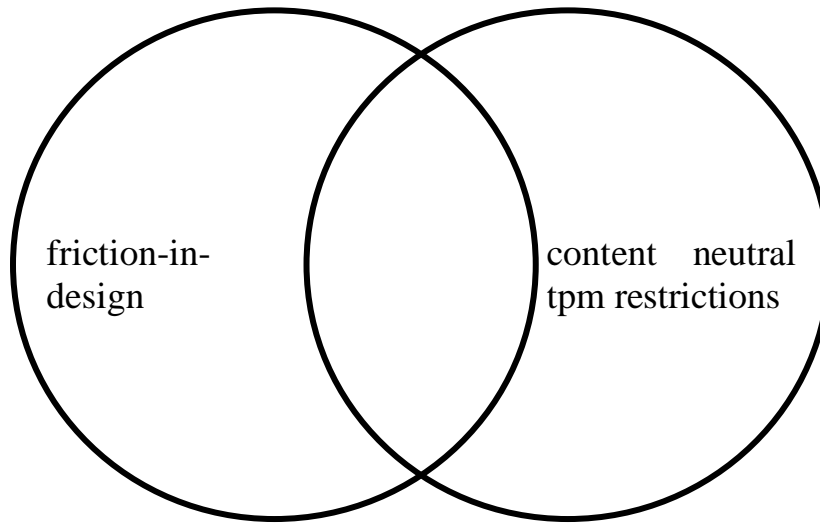
A. Time, place, and manner jurisprudence

The U.S. Supreme Court first introduced the idea of time, place, and manner restrictions on the circumstances in which speech is delivered in <u>Cox v New Hampshire (1941)</u>. Groups of 15 to 20 Jehovah's Witnesses had walked single file along Manchester, New Hampshire sidewalks carrying placards and leaflets, without first securing a special license that the state's law required for parades, and they were fined for breaking the law.[134] In deciding whether the law violated the marchers' First Amendment rights as they alleged, the Court borrowed the time, place, and manner formulation from the New Hampshire Supreme Court's prior ruling that the state law was valid, and that applicants were entitled to a license if their march's "time, place, and manner" would not "unduly disturb" the convenience of the public.[135] The U.S. Supreme Court concurred, using the same language and equivalent reasoning.

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[133] Ward v. Rock Against Racism, 491 U.S. 781, 791.

[134] Cox v. New Hampshire, 312 U.S. 569 (1941).

[135] State v. Cox, 91 N.H. 137 (1940). In New Hampshire jurisprudence, circumstantial restrictions on speech first emerged in the 1886 case of State v White, regarding a state statute against firing guns, setting off firecrackers,

In the Court's unanimous opinion, Justice Charles Evans Hughes explained that the city of Manchester's power to regulate the time, place, and manner of public demonstrations "without unfair discrimination" derived from its evident authority to control what happened on the streets in other respects. That power is necessary for maintaining public order, Justice Hughes wrote, and public order, in turn, is vital for the maintenance and enjoyment of civil liberties, including freedom of speech itself: "Civil liberties, as guaranteed by the Constitution, imply the existence of an organized society maintaining public order without which liberty itself would be lost in the excesses of unrestrained abuses."[136]

Justice Hughes' explanation of the authority to regulate the time, place, and manner of human expression - and the vital community need for such regulation - is at least as relevant for present-day online communication as it was for marching on the streets in 1939. Safe, democratic communication is often threatened by unrestrained abuses online that cause harm to individuals and to social and civic peace, at a larger scale and with much less effort than it takes to march with placards. These abuses take many forms. Some, like bullying, harassment, and terrorist recruitment, are often aimed at individuals. Others, like disinformation regarding such disparate but vital topics as COVID-19 and election results, are not personalized and reach large groups of people.

Since *Cox* the Supreme Court has gradually worked to define the proper outlines of tpm limits on expression. In *Clark v. Community for Creative Nonviolence*, a 1984 case in which the form of expression at issue was sleeping in a public park, the court set out a three part test for such restrictions: "that they are justified without

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beating drums, or making bonfires in "the compact part of any town." The respondents in White admitted to having beaten a drum but argued that it was a form of religious worship protected by the First Amendment. The New Hampshire Supreme Court disagreed, holding that religious liberty did not include the right to worship in a way that disturbs the peace. It went on to offer an early version of the time, place, and manner formulation: "[t]he state has authority to make regulations as to the *time, mode, and circumstances* under which parties shall assert, enjoy, or exercise their rights without coming in conflict with any of those constitutional principles which are established for the protection of private rights and private property." State v. White, 64 N.H. 48 (N.H. 1886) (italics ours).

[136] Cox v New Hampshire, 312 U.S. 567 (1941); George L. Blum et al., *Construction and Application of* Reed v. Town of Gilbert, Ariz., *Providing that Speech Regulation Targeted at Specific Subject Matter Is Content-Based Even if It Does Not Discriminate Among Viewpoints Within that Subject Matter*, 24 A.L.R.7th Art. 6 (2017); Elizabeth Williams, *First Amendment Protections Against Curtailment of Access to, or Retaliation for Communications on,* SOCIAL MEDIA, 38 A.L.R. Fed. 3d Art. 5 (2019).

reference to the content of the regulated speech, that they are narrowly tailored to serve a significant governmental interest, and that they leave open ample alternative channels for communication of the information."[137] In *Clark*, the Court found that the National Park Service had not violated the petitioners' rights by refusing to allow them to sleep in symbolic tent cities in Washington, D.C. parks, under a rule against camping outside designated campgrounds. The regulation passed the test since it was content-neutral and narrowly focused on the Park Service's goal of keeping its parks "in an attractive and intact condition,"[138] and there were many other possible ways to advocate for people suffering homelessness, which was the point of the symbolic tent camps.

The Court reiterated the test five years later in *Ward v. Rock Against Racism*, in dismissing a First Amendment challenge to New York City's rule requiring the use of a municipal sound system and sound technician for public concerts, to control the volume of music. The three-part inquiry is known as the *Ward* test. Also in that case, the Court held that although regulations must be narrowly focused, they need not be the least restrictive or intrusive means of achieving the government's purpose, which in this case was to keep the peace by preventing poor quality or excessive amplification of music.

Many types of friction-in-design, including some that tech companies have already adopted, would pass the *Ward* test if the state incorporated such measures into legislation. The test would not stand in the way of experimenting with other friction-in-design measures to improve social order and peace, as long as the friction is content-neutral. That is the heart of the test, after all. As we illustrate in the following section, friction-in-design policies can be and often are content-neutral.[139] They could be narrowly tailored to serve significant government (and public) interests such as preventing intergroup violence. Finally, there are almost always alternate channels and platforms for communication online. Even if regulations imposed restrictions on all communications platforms, or all similar ones, they would not shut down alternatives since

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[137] Clark v Community for Creative Non-Violence, 468 U.S. 288 (1984).

[138] Clark v Community for Creative Non-Violence, 468 U.S. 288 (1984).

[139] We do not suggest there is anything inherently good or neutral about friction-in-design; friction can be used in asymmetrical, discriminatory ways. Our point is the friction-in-design regulation can and should be First Amendment compliant when crafted to be content neutral time, place, and manner restrictions. One can certainly imagine many examples that are not. Architecture/design has often been deployed in facially neutral but actually discriminatory ways. Our point is that friction-in-design regulations can and should be First Amendment compliant when crafted to be a content neutral tpm.

friction generally makes communication less speedy or convenient, not impossible.

Content neutrality is the most important bar to constitutionality, not only in tpm cases but in First Amendment matters in general. [140] Any law that is not content neutral is presumptively unconstitutional, and must be reviewed by courts under strict scrutiny, which few laws survive. As Leslie Kendrick has pointed out, "Given that almost all laws fail strict scrutiny and almost all laws pass intermediate scrutiny, the pivotal point in the doctrinal structure is the content analysis." [141] This is neither surprising nor unwise, since content neutrality is meant to ensure freedom of expression's core purpose: that individuals not be prevented from speaking because of what they want to say, and that the law not discriminate, either against people or their viewpoints.[142]

Oddly, however, in view of content neutrality's importance and power as a doctrine, it was long unclear how to determine whether a law was content neutral. [143] Two tests for neutrality emerged, each supported by a line of cases. In one, laws were found to be content neutral as long as they did not treat speakers (or authors) differently according to what type of speech, sign, music etc. they wanted to disseminate.

The other test for content neutrality was based on the government's purpose(s) in making the relevant law. Therefore, even laws that distinguish explicitly between types of speech could be considered content neutral, as long as they served a content-neutral purpose.[144] Conversely, facially content-neutral laws were considered content-based if they were passed in order to suppress or disfavor a particular type of speech. In *Ward*, the Court noted that this view created "a separate and additional category of laws that, though facially content neutral, will be considered content-based regulations of speech: laws that cannot be "'justified without reference to the content of the regulated speech,' " or that were adopted by the government "because of disagreement with the

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[140] *See e.g.,* Elena Kagan, *Private Speech, Public Purpose, the Role of Governmental Motive in First Amendment Doctrine*, 63 U. CHI. L. REV. 413, 443 (1996).

[141] Leslie Kendrick, *Content Discrimination Revisited*, 98 VA. L. REV. 231, 237 (2012).

[142] Cox v. New Hampshire, 312 U.S. 567 (1941).

[143] R. George Wright, *Content-Neutral and Content-Based Regulations of Speech: A Distinction That is no Longer Worth the Fuss*, 67 FLA. L. REV. 2081, 2082 (2015), Genevieve Lakier, *Reed v. Town of Gilbert, Arizona, and the Rise of the Anti-Classificatory First Amendment*, 2016 S. CT. REV. 233, 234 (2017).

[144] Genevieve Lakier, *supra note 143 at* 233, 234.

message [the speech] conveys."[145] Not surprisingly, the two tests produced inconsistent results, and what other scholars have called "a confused, inconsistent, and highly malleable body of law."[146]

In a landmark 2015 case, the Supreme Court tried to reconcile the two tests. The Good News Community Church in Gilbert, Arizona had put up signs to advertise the timing of its services and was cited for violating a local ordinance that restricted "Temporary Directional Signs Related to a Qualifying Event" much more than "Ideological Signs" or "Political Signs." The church sued, and though the ordinance was obviously content-based, the federal district court and the Ninth Circuit Court of Appeals both found it to be content-neutral and ruled for the town, since the ordinance apparently wasn't intended to disfavor particular opinions or forms of content; it was meant, town officials claimed, to protect aesthetics and traffic safety.[147]

The Supreme Court overruled and offered a new "Reed two-step" test that significantly narrowed the sorts of law that count as content neutral.[148] First, all laws that discriminate facially are content-based under Reed. Specifically, a law fails to be content-neutral if it "applies to particular speech because of the topic discussed or the idea or message expressed."[149] Since "content" can refer to a topic or subject, not only an opinion or viewpoint, a law that deals with specific subject matter is considered content-based, not neutral, even if it does not discriminate among viewpoints within that subject matter.[150] In other words, any law that restricts expression based on its content is presumptively unconstitutional, must be evaluated under strict scrutiny, and will be justified only if it is found to be narrowly tailored to serve compelling state interests

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[145] Ward v. Rock Against Racism, 491 U.S. 781 (1989).

[146] Genevieve Lakier, *supra* note 143, at 233, 234. (citing Leslie Gielow Jacobs, *Clarifying the Content-Based/Content Neutral and Content/Viewpoint Determinations*, 34 MCGEORGE L. REV. 595, 602 (2003)); Barry McDonald, *Speech and Distrust: Rethinking the Content Approach to Protecting Freedom of Expression*, 81 NOTRE DAME L. REV. 1347, 1353 (2006); Dan V. Kozlowski, *Content and Viewpoint Discrimination: Malleable Terms Beget Malleable Doctrine*, 13 COMM L & POL 131, 132–34 (2008)).

[147] Reed v. Town of Gilbert (Reed III), 135 S. Ct. 2218 (2015).

[148] *Id.* (Reed III). *See also* Enrique Armijo, Reed v. Town of Gilbert: Relax Everybody, 58 B.C.. L. REV. 66, 67 (2017)

[149] *Id.* (Reed III), 135 S. CT. 2218 (2015); Alexander Tsesis, *Multifactoral Free Speech*, 110 NW. U. L. REV. 1017 (2016); Anthony D. Lauriello, *Panhandling Regulation After Reed v. Town of Gilbert*, 116 COLUM. 1105, 1105 (2016).

[150] *Id.* (Reed III), 135 S. CT. 2218, 2230 (2015).

– a test that "like a Civil War stomach wound, is generally fatal."[151] "[A]n innocuous justification cannot transform a facially content-based law into one that is content-neutral," Justice Clarence Thomas wrote for the Court.

The second step of the test focuses on the government's purpose in making the law in question, and laws that are facially content-neutral under *Reed* may still be found to be content-based "when the purpose and justification for the law are content-based." Therefore, even a facially content-neutral law may be subject to strict scrutiny.

Reed was met with "[m]uch wringing of hands and gnashing of teeth" as Enrique Armijo pointed out,[152] including from Justices Alito, Breyer, and Kagan, who all concurred but expressed concern that the new test would unduly hinder lawmaking not only regarding public signage, but in many other spheres of governance that have nothing to do with censorship but do require referring to content in order to adequately protect the public, such as securities regulation or labeling of food and drugs. [153] Many other commentators agreed, [154] and the courts indeed began to strike down laws that violated the new standard, sometimes with evident reluctance since they disagreed with the *Reed* standard for content neutrality. For example, the Seventh Circuit Court of Appeals decided before *Reed* that an anti-panhandling ordinance in Springfield Illinois "does not draw lines based on the content of anyone's speech"[155] and therefore passed Constitutional muster. But after *Reed* on a petition for rehearing, the appeals court struck down the ordinance, though the court observed that it "does not interfere with the marketplace for ideas…does not practice viewpoint discrimination, and…the distinctions that plaintiffs call content discrimination appear to be efforts to make the ordinance less restrictive, which should be a mark in its favor."[156]

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[151] Adam Liptak, *Court's Free-Speech Expansion has Far-Reaching Consequences*, N. Y. TIMES (Aug. 17, 2015)
https://www.nytimes.com/2015/08/18/us/politics/courts-free-speech-expansion-has-far-reaching-consequences.html [https://perma.cc/N8XL-42WB]

[152] Enrique Armijo, *Reed v. Town of Gilbert: Relax Everybody,* 58 B.C.. L. REV. 66, 67 (2017).

[153] *Id.*

[154] *See* Adam Liptak, *Court's Free-Speech Expansion Has Far-Reaching Consequences*, N.Y. TIMES (Aug. 17, 2015), available at http://www.nytimes.com/2015/08/18/us/politics/courts-free-speech-expansion-has-far-reaching-consequences.html [https://perma.cc/3J45-HW3Q].

[155] Norton v. City of Springfield, 806 F.3d 411 (2015).

[156] *Id.*

Some commentators have argued that *Reed* was not the bombshell that it seemed at first, since it does not reach many laws, especially those regulating economic behavior.[157] In a 2022 case decided just before this writing, the Supreme Court pushed back on the hard, bright line of *Reed*, ruling that an Austin, Texas ordinance about outdoor advertising was content neutral although it distinguished between signs on the premises of businesses and off-premise signs. For the majority, Justice Sonia Sotomayor wrote that it would be "too extreme an interpretation of this court's precedent" to consider the ordinance content-specific, as the complainants had argued, because an official would have to read a sign in order to determine whether it was on or off the premises of a business. Justice Breyer concurred and went further, asserting that *Reed* was wrongly decided. The First Amendment is not the tax code, he pointed out, so its doctrines should function "not as bright-line rules, but instead as rules of thumb." In this case, he saw no evidence that Austin had interfered with the marketplace of ideas in implementing its sign law. Justice Thomas dissented on behalf of himself and Justices Neil Gorsuch and Amy Barrett, writing that the majority's decision in *City of Austin* had improperly strayed from *Reed*. In response to Justice Sotomayor's point that local governments have been making and enforcing sign regulations for more than a century, Justice Thomas opined that this failed as constitutional originalism, for lack of evidence that the Founding Fathers took an interest in sign laws.

For now, the *Reed* standard prevails, so laws requiring friction in design must be content neutral under its terms. In many cases, as we illustrate in part 4, that can be the case.

B. Time, place, and manner online

Time, place, and manner works as a formula for regulating speech in the offline world because it describes a wide variety of efforts that humans have long made to try to capture the attention of other people. To make sure a message will be seen or heard – by people who want to receive it and often by people who don't – we turn up the volume,[158] step closer,[159] make the words bigger on a larger billboard,[160] or add digital lettering.[161] In rulings on tpm

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[157] Free Speech Doctrine after Reed v. Town of Gilbert, HARV. L. REV., 1981, 1982 (2016); Enrique Armijo, *supra* note 152.

[158] Ward v. Rock Against Racism, 491 U.S. 781, 791 (1989).

[159] McCullen v. Coakley, 573 U.S. 464 (2014)

[160] Metromedia, Inc. v. City of San Diego, 453 U.S. 490 (1981)

[161] City of Austin v. Reagan Nat. Advertising of Austin LLC, 596 U. S. ____ (2022)

cases, judges decide when, where, and how one may try to communicate to other people. After all, freedom of speech is not really what's at issue in the First Amendment and its case law, since one can speak without impinging on public order, or even on the ears, eyes, or equanimity of anyone else. The freedom in question is freedom of *reach*, as it is often called in the tech industry.[162] Reach refers to trying to capture human attention, usually with the ultimate goal of changing people's beliefs or behavior. Time, place, and manner describe (the environmental conditions for) the means of doing that. Those means depend upon and are shaped by shared resources, online as they are offline, and tpm restrictions can and should be used to distribute such resources in a more equitable, accountable, harm-preventing way than tech companies now do.

Government has so far largely avoided making this effort, but it is obliged to ensure public peace, online as well as offline. Although the First Amendment forbids the state from restricting who speaks or what they say, the state can and should, according to time, place, and manner doctrine, regulate how, when, and where speech is disseminated publicly, to maintain sufficient order so that people can enjoy peace and civil liberties including their own First Amendment rights. By focusing government regulation on the conditions of the shared techno-social environment within which speech occurs, the time, place, and manner doctrine effectively balances individual rights with collective interests in social peace and order - and with the competing rights of other people.

Most tpm cases are litigated as conflicts between the desire of some people to broadcast a message vigorously, and the public interest in social peace and order.[163] However, the facts of the cases usually describe disputes in different terms: between the rights of those who want to broadcast a message, and the rights of others who don't want to be disturbed, either by a particular message or by any message delivered in a similar way. These conflicts between

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[162] *See, e.g.,* Casey Newton, *The Interface*, June 3, 2020, https://web.archive.org/web/20221215131829/https://www.getrevue.co/profile/caseynewton/issues/snap-takes-a-stand-253815 [https://perma.cc/PTN8-KNXZ] (discussing Snapchat decision to restrict the reach of Donald Trump's account), citing technologist Aza Raskin who created the 'infinite scroll' feature described earlier while working at Mozilla). *See also* Christian Landgren, ("There is a difference between freedom of speech and freedom of reach. Everyone can express their thoughts open but they shouldn't expect that all of their thoughts to be cabled unfiltered throughout the world") https://twitter.com/landgren/status/1266984758438957056?lang=en [https://perma.cc/Z2TC-6KTM?type=image].

[163] *See, e.g.,* Hill v. Colorado, 530 U.S. 703 (2000) (holding that the governmental interest in protecting the public from harassment justified a "bubble zone" around a health care facility).

individuals are at the heart of many of the landmark tpm cases. *Ward,*[164] for instance, arose because of complaints from people who didn't want to hear the loud music of a public concert that others were keenly enjoying. It was the volume that offended - the fact that it reached unwilling listeners - not the content of the music. *McCullen v. Coakley*[165] (and other cases on anti-abortion protests outside women's health clinics) are about the inimical, competing interests of people trying to walk into a clinic, and others who try to persuade them not to enter by obliging them to receive particular types of messages. In both cases, it was the imposition of messages on unwilling audiences - vigorous reach - that led to disputes.

Indeed, the tpm formulation mediates between the interests of broadcasters and receivers of communication by drawing on, and re-drawing, social and legal boundaries against communicating in certain ways, from high volume to large billboards. [166] Those boundaries, in turn, describe lines between public and private spheres in human life, and between communication and other activities that depend upon private and public use of shared environments. Friction can improve governance of the boundaries, or seams.[167]

For example, "time," which usually refers to a time of day or night in offline speech regulation, can be used to draw lines between public and private activities, since most people follow roughly the same schedule during a 24-hour weekday cycle, including sleeping during the night. Therefore, regulations call for quiet at night with exceptions for certain noises that are permitted to protect other community interests, like the sirens of ambulances and fire trucks.

"Place" is also a means for mediating between communication and other competing activities, and governance is required because place, like time, is usually a scarce resource. Certain places are highly sought after by those who wish to communicate, usually because many other people use that shared space for other purposes. Government often physically restricts speakers to protect competing interests, including the desire of officially sanctioned speakers to communicate their own messages

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[164] Ward v. Rock Against Racism, 491 U.S. 781, 791 (1989).

[165] McCullen v. Coakley, 573 U.S. 464 (2014)

[166] Tpm restrictions are not limited to public forums, such as government property. Various zoning and sign ordinances and nuisance abatement requirements are tpm restrictions that apply to non-public forums, such as private property, as well as to public ones.

[167] *See* Frischmann and Ohm, *supra* note 87 (describing "governance seams" as friction-in design measures that operate at such boundaries).

unimpeded. This can be so severe that some places where speech is allowed have come to be known by terms like "bubble," "frozen zone," "restricted zone," or the oxymoronic "free speech cage" – a contraption of mesh fabric, coiled razor wire, chain-link fences, and jersey barriers, constructed to contain protesters at political meetings.[168]

Finally, "manner" refers to the "how," the means by which the speaker of a message tries to secure the attention of an audience, often a particular audience. As the case law reflects, manner covers a wide variety of methods of expressing oneself and conveying that expression to others, including sleeping,[169] nude dancing[170] and burning (a flag,[171] a draft card,[172] or a cross,[173] for example). Online, many of the same manners of expression can be depicted in videos. Tech companies and their engineers have also built a variety of tools for new "manners" of expression, from livestreaming to "liking" someone else's content or retweeting it. All of these, not coincidentally, expand reach.

Time and space are limited, shared resources, both for those who want to communicate with other people, and those who want to use them for different, sometimes unrelated and sometimes inimical, purposes. Those who want to broadcast a message share the relevant time and space with both its willing and unwilling audiences. Manner, again, usually describes how people use those and other shared resources. Thus, taken together, time, place, and manner are regulatory parameters for governance of shared resources.

In this context, it is useful to distinguish three types of externalities that give rise to social demand for governance:

> *(i) congestion/network effects, which are external costs/benefits usually associated with the number of users of a shared resource;*
> *(ii) productive use effects, which are external costs or benefits associated with public goods produced by resource users; and*

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[168] The 2004 Democratic National Convention, for example. *See* Timothy Zick, Speech and Spatial Tactics, 84 TEXAS L. REV. 581, 582 (2006).

[169] Clark v Community for Creative Non-Violence, 468 U.S. 288 (1984).

[170] Barnes v. Glen Theatre, Inc. (1991).

[171] Texas v. Johnson, 491 U.S. 397 (1989).

[172] United States v. O'Brien, 391 U.S. 367 (1968)

[173] Virginia v. Black, 538 U.S. 343 (2003).

(iii) interaction effects, which concern external costs or benefits associated with interdependencies among users (user types).[174]

A simple illustration is a shared grazing pasture. The classic tragedy of the commons is an allegory about the first type of effects.[175] As shepherds add sheep to their flock, they capture the benefits but bear only a fraction of the costs. This behavior can lead to congestion, and if pushed beyond a threshold (or tipping point), destruction of the shared resource. To push the allegory slightly beyond its ordinary form, we may note that the sheep not only occupy space and consume the grass, but in doing so, generate other goods, including private goods (wool) and public goods (methane emissions; bad odors). The herders also may fail to account for some of these negative effects (social costs). Finally, suppose that instead of just sheep, herders could add donkeys to their flock. Not only would the rate of grass/pasture consumption vary between sheep and donkeys, but also, let us suppose for this illustration, that sheep and donkeys fought with each other. Herders adding either animal to their stock might fail to account fully for the costs imposed on others as a result of the increased risk of conflict. Each of these externalities create demand for governance, and not necessarily the same institutions (rules, norms, etc.).

For governance of shared resources that shape speech opportunities (or constitute the speech environment), tpm restrictions usually are suitable for types (i) and (iii) but not (ii). The first type is a natural fit; it concerns managing the number of users and perhaps their speed, volume, intensity, or rate. Permits and other means for rationing use of shared space are often justified by concerns about overcrowding. The third type also is a decent fit when there is a commitment to shared multi-use of the resource. Recall the speed bump discussion. When a community is committed to multi-use streets, speed bumps can be an effective means for managing interaction effects among different users and groups. Similarly, New York City's rule requiring the use of a municipal sound system and sound technician for public concerts to control the volume of music reflects a public commitment to shared use of public space and legitimate tpm restrictions directed towards

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[174] See Frischmann, *supra* note 77 (exploring these different types of externalities in various contexts, including the shared pasture, highways, and digital spaces).

[175] On the tragedy of the commons and the limits of this allegory, see Brett Frischmann, Alain Marciano, and Giovanni Ramello, *Retrospectives: Tragedy of the Commons after 50 Years*, 33 JOURNAL OF ECONOMIC PERSPECTIVES 211-18 (2019); Brett Frischmann, *Two Enduring Lessons from Elinor Ostrom*, 9 JOURNAL OF INSTITUTIONAL ECONOMICS (2013).

interaction effects among different types of users.[176] The second type is a poor fit because social demand for governance is generally associated with the type of public good being produced and in this context that will almost always be content based.

In online spaces, time, place, and manner may be understood differently from their offline meanings, of course, but they serve equally well as a system for governing shared resources for communication. Digital networked technologies have reshaped the speech environment, that is to say the set of shared resources that individuals and communities rely on to develop and share ideas, relationships, and culture.

Time usually refers offline to a segment of time during a day, night, week, or month. This distinction breaks down online since digital communications often cross time zones, and many digital communications are asynchronous, which often means that communicative and social boundaries are easily blurred. Online, time can instead refer to the length of time it takes to complete an action or see a result. Many of the most familiar forms of friction-in-design, like speed bumps, are intended to slow down a process so that it is more in line with typical human reflexes (when driving, for example) or to give people time to reflect briefly before acting.

Place, and how it is experienced virtually, has been the subject of more thought and theorizing than we can adequately describe here.[177] For our purposes, it is sufficient to point out that opportunities for communication are always limited in digital spheres, just as they are on streets and in public parks. Digital

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[176] See Ward v. Rock Against Racism, 491 U.S. 781 (1989). While the Court did not expressly make this point, it is worth noting that quiet enjoyment of my own space on a park bench being disturbed by your volume regardless of content (whether you're playing jazz or rock or rap or preaching) is an interaction effect.

[177] *See e.g.,* DOREEN MASSEY, SPACE, PLACE, AND GENDER 146 (1994); GERMAINE R. HALEGOUA, THE DIGITAL CITY: MEDIA AND THE SOCIAL PRODUCTION OF PLACE (2020); Jennifer Stromer-Galley and Rosa Mikeal Martey, *Visual spaces, norm governed places: the influence of spatial context online*, 11 NEW MEDIA & SOCIETY 1041 (2009); Jonathan J. Rusch, *Cyberspace and the "Devil's Hatband",* 24 SEATTLE U. L. REV. 577 (2000); Alfred C. Yen, *Western Frontier or Feudal Society?: Metaphors and Perceptions of Cyberspace*, 17 BERKELEY TECH. L.J. 1207 (2002); Dan Hunter, *Cyberspace as Place and the Tragedy of the Digital Anticommons*, 91 CAL. L. REV. 439 (2003); Mark A. Lemley, *Place and Cyberspace*, 91 CAL. L. REV. 521, 525 (2003); Maureen A. O'Rourke, *Property Rights and Competition on the Internet: In Search of an Appropriate Analogy*, 16 BERKELEY TECH. L.J. 561 (2001); Orin S. Kerr, *The Problem of Perspective in Internet Law*, 91 GEO. L.J. 357 (2003); Brett M. Frischmann, *The Prospect of Reconciling Internet and Cyberspace,* 35 LOY. U. CHI. L. J. 205 (2003). *See also* GEORGE LAKOFF & MARK JOHNSON, METAPHORS WE LIVE BY (1980).

networked technologies supply the architecture of digital places, determining the constraints, affordances, and opportunities within the speech environment. In the same way that not everyone can speak at once - and be heard - in a crowded hall, it is always the case that some content is more accessible and visible than other content online.

Whether tpm is eventually adopted as a basis for regulation of companies' policies or not, the companies should adopt the rubric themselves, to make their policymaking more consistent and more intelligible to outsiders. Thus far, tech companies have distributed communicative resources with a heavy hand on a largely invisible scale, by means of platform architecture, algorithms, and interfaces. Their policymaking lacks a consistent theoretical basis for balancing rights and interests and maintaining public order. As others such as Kate Klonick, evelyn douek, and Tarleton Gillespie have described, the companies make policy and rules in a piecemeal and iterative way, frequently change them, and enforce them inconsistently.[178]

People are accustomed to competing for access to resources and opportunities to engage with others offline, but they are much less able to appreciate, understand, or determine the means by which their access to digital resources is granted or denied or to evaluate whether the distribution of those resources is inequitable and harmful. It's hard to miss a locked door, a police officer ordering you to leave, or a poster that's been torn down or covered up. By contrast, learning how (easily or not) people can see your content on social media – and how that compares to the circulation others enjoy – is much more difficult.

For successful governance that will not undermine fundamental rights like freedom of expression, nor damage democratic life, companies need a solid theoretical basis to apply consistently, and that their users can understand. In addition to protecting users' freedom of reach, companies should protect others from being subjected to content in a way that could disturb the peace or public order, or that would harass them. Peace must be understood to have both online and offline components, in other words it includes preventing the online equivalent of a megaphone at 3 a.m., as well as inhibiting online activity that produces violence offline.

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[178] Klonick, *supra* note 62; Gillespie, *supra* note 62; evelyn douek, *The Free Speech Blind Spot: Foreign Election Interference on Social Media,* in Defending Democracies 265 (Duncan B. Hollis & Jens David Ohlin, eds., 2020).

To do this effectively, companies should adopt tpm as a basis for their own governance of online behavior, even in the absence of regulation obliging them to do so.

IV. EXPLORING THE REGULATORY TERRITORY REVEALED

Friction-in-design regulation needs to be a substantial part of digital networked technology regulation, as we suggested in the Introduction and Part I. Such regulation probably will trigger First Amendment concerns when it is directed, as we suggest it should be, at digital architectures, online platforms, supposedly smart (data-driven, algorithmic) systems, and human-computer interfaces. We have argued that friction-in-design regulation can and should be formulated as content neutral time, place, and manner restrictions, when that is possible, for two primary reasons: it is consistent with the precedent and theories behind the First Amendment, and it provides a normatively attractive approach to online governance.

This Part is descriptive and exploratory. We aim to chart a path forward for friction-in-design regulation. There are viable policy proposals to be developed and applied in some contexts. There are also substantial gaps in our knowledge about the range of regulatory options, how they would work in practice, and how effective they would be in improving the digital networked environment. This article primarily aims to open the regulatory possibilities and frame and motivate systematic empirical research.

We explore state regulation of code, architecture, and interface design that (i) requires friction with a functional purpose that serves legitimate social ends and (ii) qualifies as a time, place, and manner restriction. We aim to explore regulatory possibilities in a somewhat speculative manner, akin to thought experiments that look for and test boundaries.

Time, place, and manner are parameters, not independent regulatory categories. In other words, as discussed in the previous section, the core theory of tpm restrictions is focused on government regulation of the conditions of the environment within which speech occurs. Content neutrality means that the regulation cannot focus on who says what or why, but it can and should focus on where, when, and even how. These are not mutually exclusive considerations. Thus, as we explore below, there are many interesting combinations.

Before proposing some possibilities to explore, we think it is worth making a few general observations. First, one type of friction that will generally be worth considering is *time delays*. The simple reason is that time is often the scarce resource, an essential input, people need to be able to think for themselves, whether to deliberate, contemplate, account for consequences, anticipate regret, second-guess themselves or others, and so on. Another simple (but no doubt contestable) reason is that the marginal benefit of *instantaneous* communications made possible by the Internet is often trivial. In other words, for most communications (to, from, and among human beings), time delays do not necessarily impose a significant burden.[179] Of course, this claim very much depends on the magnitude of the delay. We will return to this below with some examples.

A second type of friction that will generally be worth considering is *work* (labor, deliberation, active choosing). The functional purpose of such work can vary considerably, from enabling meaningful engagement to encouraging valued behaviors to verification and authentication.[180] This type of friction might be a combined time and manner restriction. In some cases, like the e-contracting example in the Introduction, it might not trigger First Amendment scrutiny.

Third, geographic distance may be a relevant factor in friction-in-design regulation. Most laws are based on geography. Geographic distance is, for most actions and corresponding effects, a relevant factor. Online, however, geographic distance seems less relevant, though that is not immutable because it is a product of the technical architecture. Geographic borders and even geographic distance do not seem to impact what people are capable of doing and what they in fact do online. After all, using the Internet, a person can easily (with a click of a button, at zero marginal cost), instantaneously communicate an idea (story, joke, etc.) to millions of people around the world. Yet the fact that the Internet makes it

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[179] We are not suggesting that latency in data transmission does not impose a burden on certain applications. Sometimes it does, and as noted in the text, how much of a burden depends on the application and the delay. Voice over IP (VOIP) applications are a classic example of an application that is latency-sensitive. If VOIP packets are delayed too much (over 100-200 milliseconds), then the quality of the call will suffer. But even in the VOIP example, there is some room for tolerable delay.

[180] Consider, for example, friction-in-design in the form of reverse Turing tests designed to identify when humans are behaving like machines. These would be comparable to familiar CAPTCHAs used for security, but the purpose would be to afford users time and information needed for deliberation and active choosing. *See* Frischmann & Selinger, *supra* note 2.

possible for geography and geographic distance to be unimportant to Internet users does not mean that geography and geographic distance do not matter normatively or that geography and geographic distance cannot be factors in friction-in-design regulation.[181]

Digital friction-in-design measures (general)	Architectural features of website, app, or human-computer interface
Types of friction	Time delay. Work, task performance, different forms of labor (cognitive, emotional).
Direct effect(s) of friction on subjects	Delayed access to system, resource, or content; prompt deliberation or consideration; shift thinking from fast/automatic (system 1) to slow/deliberative (system 2); prompt action or labor; cause inconvenience, annoyance.
Architectural design of friction	Software code. Human-computer interface design. Coded interactions. Information provision. Aesthetic design features. *Note: These are often features that constitute speech and thus trigger FA in the first place. But it may be possible to regulate interactions and outcomes without focusing on code. For example, the contract law example in the beginning required proof of meaningful engagement without specifying how such proof is generated.*
Purpose(s) of friction; intended (social) impact(s) of friction	Welfare improvements, enable autonomy, avoid conditioning or learning bad habits, avoid addiction; 1st person-oriented ends but also externalities, third-party effects, improve social environment within which social interactions occur. Enable better systems–e.g., for security, knowledge sharing, or even generating reliable evidence. *Note: Purposes will be relevant to FA analysis*

[181] *See* JACK GOLDSMITH & TIM WU, WHO CONTROLS THE INTERNET? ILLUSIONS OF A BORDERLESS WORLD (2006). But *see* David R. Johnson & David G. Post, 48 STAN. L. REV. 1367 (1996).

	of state interest and tailoring.
Scope of application	Always on versus special triggers.
	Note: Special triggers are more likely to raise content neutrality concerns.
Governance	Vary considerably by context.

A. Time delays based on geography or geographic distance

Many, including one of us, have celebrated Internet affordances that enable near instantaneous communication to millions of people around the world at trivial marginal cost. But such celebration was most likely premature and overextended. There are very few–if any–situations in which communicating with millions of strangers needs to happen so quickly or easily. There is nothing natural or sacrosanct about this powerful capability.[182] Arguably, its exploitation contributes to humanity's techno-social dilemma, although that is an argument that merits further attention and elaboration. For the sake of argument, let us suppose it is the case. How might friction-in-design regulation help?

Consider the following regulation: Digital communications that cross State boundaries must be delayed by [x] milliseconds (seconds, minutes, or hours). Perhaps this is a terrible, unworkable idea; perhaps not. Consider that separately. The point here is only to illustrate one type of plausible friction-in-design regulation. It is a content neutral, time-delay triggered by a jurisdictional boundary–a modern tpm restriction for the digital networked environment. What would be the purpose of such an intervention? A slight delay could be aimed at reducing virality, constraining the scale and scope of digital communications, and even, perhaps most importantly, enabling a governance seam at the jurisdictional border. Such objectives admittedly run directly against the conventional wisdom and design mantras noted in Part I, and thus, would face strong political opposition. That is to be expected.

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[182] As Lessig emphasized so long ago, the Internet has no nature, except perhaps that it is socially constructed and malleable. *See* Lawrence Lessig, CODE: AND OTHER LAWS OF CYBERSPACE (1998).

Time delay based on place / geography	
Type(s) of friction	Time delay.
Direct effect(s) of friction on subjects	Delayed transmission, delivery, or access to content, resource, system.
Architectural design of friction	Variety of implementations, at different layers of the Internet.
Purpose(s) of friction; intended (social) impact(s) of friction	Reduce virality, constrain scale and scope of digital communications, enable governance seam at jurisdictional border.
Scope of application	Geographic trigger.
Governance	State sovereign. Regulatory agency.

Now, let's consider some seemingly far-fetched examples of how such a regulation might be implemented: Suppose the US government requires Broadband Internet Access Service providers to artificially delay (congest) all international Internet traffic by 5 seconds. Or suppose the US government requires platforms that host and deliver user-generated content to artificially delay (congest) all international Internet traffic by 5 seconds. State regulation that requires a time delay for *all* traffic–regardless of who is the speaker or recipient and without regard for the content or message–triggered by a geographic boundary or distance would qualify as a content-neutral tpm. It might struggle under intermediate scrutiny, of course.[183]

B. Time delays based on social graphic distance.

Consider another example: friction-in-design regulation that requires a time delay based on social graphic distance. Suppose social media platforms and applications must delay communications among weak ties by [x] seconds and communication among

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[183] Satisfying the narrow tailoring and substantial government interest standards could be difficult. The main difficulty will be in choosing the time delay – why 5 seconds rather than 2 seconds? – and showing how it is narrowly tailored.

strangers (non-ties) by [y] minutes; communications among strong ties are not delayed at all. This type of friction-in-design regulation could be content neutral and qualify as a modern tpm.

Again, the type of friction is just a time delay. Social graphic distance is the triggering condition. We recognize that it is somewhat crude as a measure. Accordingly, one interdisciplinary research question we would like to explore (with others) is whether we can develop an operational variable akin to geographic distance for social graphic relations. Building from social graph theory and other technical measurements of tie strength, we believe we can develop a usable concept of social graphic distance.[184]

This proposal might seem outlandish. Why would anyone wish to slow down communications among weak ties? There are some good reasons to believe that weak ties are very important socially and economically and that one of the benefits of social networking online is the chance to find and create a much richer and diverse portfolio of weak ties. Yet even to the extent that such arguments have merit, they say very little in favor of *instantaneous* communications or against time delays. And there are countervailing arguments concerning the necessary tradeoffs human beings face in managing/devoting limited time, attention, and other resources to developing and sustaining meaningful relationships. Digitally networked technologies designed to enable and even encourage frictionless communications are not neutral as to the types of speech or relationships produced; rather, such design may steer people toward cheap speech and persistent attending to weak ties and in some cases, seeking the attention of non-ties in the hopes of generating more weak ties.

Regulation requiring friction-in-design that imposed a cost in the form of a time delay could afford people the time they need to stop and think about their communications, to pay attention to what they are saying, how, and to whom. In all likelihood, other complementary types of friction that help in framing such deliberative processes might be needed as well.[185] Frictional reframing of the techno-social environment might entail alerts that prior to sending, raise the salience of certain details, such as who are the likely recipients of a communication. Calling such interventions

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[184] Of course, as in geography, distance isn't all that matters. Other characteristics that describe relationships between people also matter. One idea is to reconceptualize our notion of place to incorporate geographic as well as social-graphic relations.

[185] *See* Alexis Shore & James J. Cummings, *An Exploratory Analysis of Interface Features Influencing Mobile Location Data Disclosure,* INTERNATIONAL JOURNAL OF HUMAN–COMPUTER INTERACTION (2022).

frictional reframing is meant to suggest a potential conflict with the defaults set by providers, who are likely to either frame communications as frictionless or employ friction asymmetrically in favor of scripted behavior (deliberation-free speech). This is an area worth exploring further.

There might be a much stronger case for this type of friction-in-design regulation if we focus just on slowing communications among strangers (non-ties). Instantaneous communications with or among (potentially many) strangers may undermine development of meaningful social relationships, trust, social norms, and other social goods; contribute to unchecked virality; open people up to manipulation and other forms of techno-social engineering. Note that embedded in this proposal are significant limits based on the scope of the perceived problem–*instantaneous* communications with strangers; the proposed solution of a time delay only targets the speed. That slight friction is worth considering and researching further.

Content neutrality seems to be an obstacle. At first glance, it might seem that the triggering condition (tie strength; nature of social relationship) could be a problem because it seems to target certain speakers or listeners. But this is not so. The regulation would address all speakers and listeners equally, only target speaker-listener pairings, and critically, would not be based on the content, nor on the speaker's or listener's identity or viewpoints.

If time delays based on social graphic distance qualify as content neutral tpm, then the friction-in-design regulation still must satisfy intermediate scrutiny. Overcoming that hurdle would ultimately depend on the details of the regulations and the empirical evidence. Again, in this paper, our goal is to reveal this possible path, to explore regulatory possibilities. Time delays based on social graphic distance seem plausible as content neutral tpm restriction.

C. Manner restrictions for digital networked communications.

Another potentially broad category of friction-in-design regulations could focus on *how* the digital networked environment shapes digital networked communications and the (already heavily engineered but mostly unregulated) techno-social *conditions* in which communications occur. This category might be classified as

manner restrictions for digital networked communications.[186] Alternatively (or additionally), if we understand the digital networked environment in terms of how individuals and groups experience and conceptualize their interactions with each other and the technologies, then these restrictions also might qualify as place restrictions. After all, scholars have long recognized and debated the significance of the many place-based metaphors people consistently use to describe and understand their experiences online.[187] To keep things simple, we use the manner restriction label but recognize that manner and place might be substituted or combined, depending on the example.

Some friction-in-design regulations could address the manner in which communications are shared online. In the offline context, municipal restrictions on the volume of technologically amplified speech are quite common and have been upheld as content neutral time, place, and manner restrictions. In the digital networked context, the WhatsApp forwarding restriction discussed previously is a decent analogous example. Governments could plausibly impose a similar friction-in-design requirement on platforms and apps that afford users the capability to forward messages. Such a "slow-forwarding" friction-in-design regulation could be tailored to different classes of platforms or apps, based on their scale and scope. The government interests in reducing virality and the spread of false information would be substantial. As with setting time delays, setting the trigger condition would present empirical questions under the narrow tailoring part of the intermediate scrutiny analysis. But the triggering condition could be content agnostic and based on quantitative (e.g., # of forwards) rather than qualitative considerations.

WhatsApp Forwarding Friction	
Type(s) of friction	Scale and scope restriction on message forwarding.

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[186] An interesting subcategory might be friction-full content moderation. This requires brainstorming and development, but the basic idea would be to look at the full content moderation ecosystem and identify opportunities for friction-in-design. We would shift the focus from content as the subject of moderation to the code, architecture, and interfaces that already moderate human behavior and social interactions. After all, content moderation problems are often the result of digital networked technologies designed and optimized for maximum scale, scope, reach, and superficial engagement. *See supra* Part 1. *See also* Brett Frischmann & Paul Ohm, *supra* note 115.

[187] *See supra* note 155.

Direct effect(s) of friction on subjects	Friction generates delay and requires more work for messages to reach a larger audience.
Architectural design of friction	Coded interaction between user app and WhatsApp servers.
Purposes of friction; (un)intended (social) impacts of friction	Reduce virality; reduce spread of misinformation. Reduce spread of all messages.
Scope of application	Measure triggered when a message is forwarded 5 times.
Governance	WhatsApp governs its implementation. Government mandated restriction would likely fall under purview of a regulatory agency.

Other types of manner restrictions for digital networked communications might focus on the *conditions* under which communications occur. Consider, for example, alerts prior to content sharing, comprehension checks that test whether people anticipate the possible reach of their communications, or social proof checks that ask whether someone would like to run this post by one of their strong ties. Analogous to speed bumps, alerts generally involve a slight time delay coupled with optional cognitive work, such as processing information and deliberating about consequences and whether/how to proceed with the communication. In a series of studies, researchers found that "interstitial warnings" that "interrupt users and require interaction" (thus qualifying as friction-in-design in our framework) are more effective at changing user behavior than "contextual warnings" that "do not interrupt" users or require interaction (not involving friction-in-design).[188]

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[188] *See* Ben Kaiser et al., *Adapting Security Warnings to Counter Online Disinformation*, PROC. OF THE 30TH USENIX SEC. SYMP. 1163 (AUG. 11–13, 2021) at, https://www.usenix.org/conference/usenixsecurity21/presentation/kaiser [https://perma.cc/BP28-3V7G] (summarizing security research, collecting sources, and reporting on extension to disinformation warnings).

Alerts as Friction-in-design	
Type(s) of friction	Alert or warning message as source of virtual drag. (E.g., pop-up that must be cleared prior to sharing content.)
Direct effect(s) of friction on subjects	Friction generates delay and provides salient information. Subjects may ignore or process, and this may lead to deliberation and possible behavioral change.
Architectural design of friction	Varies. Coded interaction. E.g., pop-up.
Purposes of friction; (un)intended (social) impacts of friction	Enable informed choice. Counteract engineered automaticity (auto-clicking, mindless sharing, and other related behaviors).
Scope of application	Varies.
Governance	Varies.

Comprehension and social proof checks could generate time delays and require work. Analogous to roadblocks, checkpoints, and CAPTCHAs, these friction-in-design measures enable a type of authentication, sometimes for oneself and sometimes for or by others. These measures are similar to those being tested on some social media platforms, such as Twitter.[189] If government regulation required such friction-in-design measures, there would be opposition rooted in the First Amendment. These types of measures could be content-agnostic and apply to all posts, although that could be costly and perhaps even counterproductive *if* repetition generates fatigue and people developed the habit of ignoring alerts. These are important empirical questions to study. The difficulty, if such burdens proved counterproductive, might be in developing content neutral triggering conditions.[190] But just to be clear, that difficulty can be overcome. For example, one approach might be to randomize alerts and checks. It is a matter of institutional design and

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[189] *See supra* Part 2.A.
[190] TikTok's sensitive content warning, discussed above, directly relies on a characterization of the content to trigger the warning. Regulation requiring these types of warnings would not qualify as content neutral tpm.

comparative analysis. There is a rather open regulatory territory to explore; we have only scratched the surface.

Finally, we would like to suggest that proposals to regulate interface design also might be conceptualized as manner restrictions. For example, a regulation that required (i) greyscale in menu settings, rather than colors that nudge; (ii) frictions in interface design to disable infinite scrolling and instead require slight time delays and authentication measures to enable self-governance; or (iii) active choosing by default and design. [191] Each of these examples of friction-in-design regulation could qualify as a content neutral time, place, and manner restriction.

Consider the iPhone geolocation tracking example discussed in Part II. Apple employs friction-in-design to steer users towards giving the green light for geolocation tracking and associated services and for such permission to remain always on. To address Apple's asymmetric use of friction-in-design to disfavor user

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[191] A perennial question in the literature on nudging (social engineering) is whether choice architects should (i) set a default and allow people to choose something other than the default or (ii) require people to actively make a choice. *See* CASS R. SUNSTEIN, CHOOSING NOT TO CHOOSE: UNDERSTANDING THE VALUE OF CHOICE (2015); *See also* Cass Sunstein, *Choosing Not to Choose,* 64 DUKE LAW JOURNAL 1 (2014). Choice architects constantly make such decisions in ways that shape our lived-in environments. It is easy to take it for granted. In many everyday situations, we need to decide whether we should go with the flow and take things as they come, accepting the defaults architected into the environments we visit, or challenge the defaults and pursue other options. Yet in some situations, going with the flow and accepting defaults is not even an option because we're forced to actively make a choice. *See* Brett Frischmann, *Nudging Humans,* 36 SOCIAL EPISTEMOLOGY 129 (Oct. 2021). This is by design. Here is a simple example:

> Consider the supermarket and how a choice architect structures the consumers' choices about choosing paper or plastic bags. The supermarket can set the default, say with paper (or plastic), and then allow you to opt out if you prefer plastic (or paper). Either way the default is set, and the supermarket allows you to choose not to choose (accept the default) or to choose to choose (reject the default and select the alternative). The supermarket also can require active choosing, in which case it doesn't set the default and instead asks you to choose between the available options. Id.

Consider the following active choosing friction-in-design rule: "When public and private institutions through choice architects have opportunities to set defaults or require active choosing, the institutions should, as a default for their own choice, require active choosing." Id. Friction-in-design regulation could operationalize this active choosing by default rule in some contexts. It also could be seen as a manner restriction.

privacy, regulators might use options (i) and (iii); specifically, regulators might require greyscale in menu settings, rather than colors that nudge, and friction-in-design of the interface so that a user must "turn[] geolocation tracking on and off for each app as needed."[192] One might object to the grayscale requirement as necessarily being content based. After all, a regulator would be telling a company what color to use in its graphical design. This design choice about color may seem to be about the content of the designer's speech, like the colors chosen by a painter. While superficially appealing, this is a poor analogy. Let us be clear that graphical design can be creative and expressive like a painting. But here we are talking about privacy menu settings, which are functional and transactional.[193] The greyscale restriction is based on the manner in which parties relate and transact with respect to geolocation data; the government purpose would be neutral as to content as it would be aimed at establishing a level playing field for such transactions.[194] The second intervention would increase transaction costs and that could annoy users and app developers. It would demand more attention and effort by users but also remind them that they're being tracked. It could make geolocation tracking salient, something they might stop and think about. While the merits of this proposal require more detailed analysis, and the politics would of course be contentious, our main point is that regulation of interface design could qualify as a content neutral manner restriction if such regulation were challenged under the First Amendment.[195]

CONCLUSION

Friction-in-design does a lot of socially valuable work offline that is often taken for granted, in large part because it is successful. For example, people have generally accepted speed

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[192] *See* Frischmann, *supra* note 191.

[193] To the extent that the design of privacy menu settings is expressive speech, it would be commercial speech as it essentially constitutes a negotiation over the terms of the transaction between Apple and the user. In general, the U.S. Supreme Court defines commercial speech as that which "does no more than propose a commercial transaction." Virginia St. Bd. of Pharmacy v. Virginia Citizens Consumer Council, 425 U.S. 748, 762 (1976), quoting Pittsburgh Press Co. v. Human Rights Comm'n, 413 U.S. 378, 385 (1973).

[194] The proposed regulation is closely related to regulation of product labels and warnings as well as contract law doctrine that imposes restrictions on font size and placement of text to provide notice, which effectively restricts website design choices. *See e.g.*, Specht v. Netscape, 306 F.3d 17 (2nd Cir. 2002) (conspicuous notice for contract formation online).

[195] The second restriction would not likely trigger a First Amendment objection.

bumps as a useful status quo. Nonetheless, there is a persistent assumption that making tasks easier and faster is always better, so economists and engineers often reflexively seek to eliminate friction. Nowhere is this more evident than in the digital networked world of frictionless architectures and interfaces optimized for revenue-maximizing engagement and scripted behavior.

Friction-in-design can support deliberation, self-governance, and the genuine exercise of free will (as opposed to following scripts), and such measures also can support social interactions, trust, and community governance. We cannot rely on market forces alone, however, to steer companies toward friction-in-design-for-social-good. The dominant logics and design mantras that have shaped the digital networked world to date are too powerful and deeply entrenched. Friction-in-design regulation is needed.

There are, at least in the United States, two obstacles to friction-in-design regulation for the digital networked world that are not present offline.[196] First, since regulation would target digital code, architecture, and interfaces that shape communications and more broadly the speech environment, there are concerns about the First Amendment. We have proposed a theoretically novel and jurisprudentially sound solution, which is to formulate friction-in-design regulation as time, place, and manner restrictions.

Second, while there is a robust scientific and engineering literature on speed bumps, other traffic calming measures, and other forms of friction in offline design, including studies of their effects on human behavior, the same cannot be said about digital speed bumps and other friction-in-design measures. They are rarely studied rigorously, with the exception of privacy- and security-by-design research. In some cases, friction is introduced by private companies in hasty response to problems such as the viral spread of disinformation,[197] usually without any effort at A/B testing, and when there are findings, companies typically keep them private. (Industry does use A/B testing routinely for other ends, for example, to increase the time that users spend on a platform.) Tech companies

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[196] Some obstacles, like politics, exist for both.

[197] Ryan Browne, *WhatsApp Tightens Message Forwarding Restrictions to Combat Coronavirus Misinformation*, CNBC, (April 7, 2020), www.cnbc.com/2020/04/07/whatsapp-limits-message-forwards-to-combat-coronavirus-misinformation.html, [https://perma.cc/ZC9B-PSXV]; Christine Fisher, *Facebook Limits Forwarding on Messenger to Fight Misinformation*, ENGADGET, (Sept. 3, 2020), www.engadget.com/facebook-messenger-forwarding-limit-misinformation-142741554.html [https://perma.cc/L7HQ-AMSQ].

are highly resistant to sharing necessary data with outside researchers who would publish their findings.[198] While such data sharing is a vital first step, it isn't sufficient.

Finding the best interventions to improve human behavior, and therefore human life, without causing other harms is a major undertaking that calls for a concerted public research effort. In sum, friction-in-design should be tested and studied at scale in the digital world. With this Article, we hope to have begun clearing the path for it.

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[198] To overcome this problem, one of us has co-founded a coalition "to advance, defend, and sustain the right to ethically study the impact of technology on society". *See* Coalition for Independent Tech Research, OSF https://osf.io/kzhb3/ [https://perma.cc/V9WJ-2RCU]