

Encouraging Entrepreneurship and Innovation Through Regulatory Democratization

SETH C. ORANBURG*

TABLE OF CONTENTS

I.	INTRODUCTION	758
II.	THE STARTUP STUDY	762
III.	REGULATORY DEMOCRATIZATIONS.....	768
	A. <i>Paubox</i>	773
	B. <i>AirMap</i>	776
	C. <i>Avalara</i>	779
	D. <i>Cognigo</i>	780
	E. <i>Metomic</i>	782
	F. <i>Amazon Web Services (AWS)</i>	783
IV.	ANALYSIS OF REGULATORY DEMOCRATIZATIONS	786
	A. <i>The Nature of Regulation</i>	787
	1. <i>Rules Versus Standards</i>	787
	2. <i>Simplicity Versus Complexity</i>	789
	3. <i>Evolution of Standards into Rules</i>	790
	B. <i>Rules, Standards, and Regulatory Democratization</i>	790
	1. <i>Simple Rules and RD</i>	791
	2. <i>RD's Incompatibility with Standards</i>	792
	3. <i>Complex Rules and RD</i>	794
V.	IMPLICATIONS FOR POLICY.....	796
	A. <i>Regulatory Sandboxes</i>	797
	B. <i>Regulatory Information Sharing Regimes</i>	799
	C. <i>Tax Credits for Startups</i>	801
	D. <i>Deregulation?</i>	803
VI.	CONCLUSIONS.....	806

* © 2020 Seth C. Oranburg. Assistant Professor of Law, Duquesne University.

I. INTRODUCTION

Entrepreneurship provides a path to prosperity for many people.¹ In particular, women and minorities prefer entrepreneurship as their path to achieve the American Dream.² In their striving, their startups and small businesses benefit our entire society.³ Entrepreneurial innovation has a positive impact on social welfare.⁴ For these reasons, the federal government has implemented numerous policies designed to support small businesses and promote startup innovation.⁵

However, these policies appear to be inadequate. Recent studies have shown that startups and small businesses are less successful than large, incumbent firms.⁶ Despite what the shows *Shark Tank* and *Silicon Valley* depict, outside of certain high-tech fields, American entrepreneurship is declining.⁷

1. Entrepreneurship is the ability to “make something” of oneself. As coined in 1931 by John T. Adams, entrepreneurship symbolized the democratization of opportunity that is the American Dream. Rebecca Gill, *The Evolution of Organizational Archetypes: From the American to the Entrepreneurial Dream*, 80 COMM. MONOGRAPHS 331, 337 (2013).

2. See Alicia M. Robb, *Entrepreneurial Performance by Women and Minorities: The Case of New Firms*, 7 J. DEVELOPMENTAL ENTREPRENEURSHIP 383, 383–97 (2002).

3. Entrepreneurship positively impacts social welfare in two ways: by major innovations that shock the equilibrium through creation of a new product or process, which is also referred to as Schumpeterian entrepreneurship or creative destruction, and by minor innovations that bring the market price close to equilibrium, which may be called Kirzner entrepreneurship. See Samuel Bostaph, *Schumpeter vs. Kirzner on Entrepreneurs*, MISES INST. (May 16, 2019), <https://mises.org/wire/schumpeter-vs-kirzner-entrepreneurs> [<https://perma.cc/D2GY-YRFP>]; see also *infra* Part III.

4. See Bill Conerly, *Innovation Benefits Society, Not Just the Rich*, FORBES (Oct. 21, 2018, 7:39 AM), <https://www.forbes.com/sites/billconerly/2018/10/21/innovation-benefits-beyond-the-filthy-rich/#22d61feb6a6a> [<https://perma.cc/8CYK-GT4B>]; see also William D. Nordhaus, *Schumpeterian Profits in the American Economy: Theory and Measurement* 1, 34 (Nat'l Bureau of Econ. Research, Working Paper No. 10433, 2004), <https://www.nber.org/papers/w10433.pdf> [<https://perma.cc/7AAU-RFXG>] (“Using data from the U.S. nonfarm business section, I estimate that innovators are able to capture about 2.2 percent of the total social surplus from innovation.”).

5. See Lewis D. Solomon & Garry S. Grossman, *Tax and Non-Tax Policies to Promote Capital Formation: Stimulating High Technology in the 1980's*, 1 AM. J. TAX POL'Y 63, 115 (1982).

6. See Jeremy Quittner, *The American Dream is Dying: How Entrepreneurs Can Change That*, INC. (Jan. 14, 2015), <https://www.inc.com/jeremy-quittner/milstein-commission-and-salvaging-the-american-dream.html> [<https://perma.cc/E6UV-Z2PC>]; Steve Case, *Can Startups Save the American Dream?*, CASE FOUND. (Jan. 14, 2015), <https://casefoundation.org/blog/can-startups-save-american-dream/> [<https://perma.cc/Z9XJ-AUJ2>].

7. See Philip Aldrick, *With Startups Declining, the American Dream is Beginning to Fade*, TIMES (July 2, 2018, 5:00 PM), <https://www.thetimes.co.uk/article/with-startups-declining-the-american-dream-is-beginning-to-fade-k8grswhv5> [<https://perma.cc/NTS7-ABC2>].

The decline of entrepreneurship and its counterpart, innovation,⁸ could well be the result of over-regulation. It is axiomatic that innovation is harder, slower, and less successful in highly regulated industries.⁹ Legal scholars have suggested that this phenomenon might be explained by the distributional effects of regulation: although well-intentioned lawmakers might try to devise regulatory regimes that support entrepreneurs, the larger incumbents in the market are more able to influence and benefit from the regulatory process.¹⁰ Therefore, regulations by nature are at odds with startup innovation.¹¹

This argument is incomplete. It is right insofar as studies show that higher regulation is correlated with lower innovation.¹² However, this argument is wrong in that it collapses all different sorts of regulations into one.

This Article will show that not all regulations are created equal. Instead, regulations can be more precisely categorized across two axes: complex versus simple, and rules versus standards.¹³ This more nuanced analysis of regulation, split into four categories, reveals that some categories of regulation are more likely to impact entrepreneurial innovation than others. Moreover, this provides some hope that smart regulation can provide an optimal middle ground between over-regulation and over-deregulation.¹⁴

8. See Parimal Merchant, *Why Innovation and Entrepreneurship Go Hand in Hand*, Entrepreneur (May 21, 2018), <https://www.entrepreneur.com/article/313753> [<https://perma.cc/9ULP-N2GS?type=image>] (“Entrepreneurs innovate.”).

9. See Naoimi Fried, *Innovating in a Highly Regulated Industry Like Health Care*, HARV. BUS. REV. (June 12, 2017), <https://hbr.org/2017/06/innovating-in-a-highly-regulated-industry-like-health-care> [<https://perma.cc/J535-PTXN>] (“Innovating in regulated industries takes longer than in other industries. . . . Expect setbacks. Innovation is rarely easy, especially in regulated industries.”).

10. See Mirit Eyal-Cohen, *The Cost of Inexperience*, 69 ALA. L. REV. 859, 863–64 (2018) (“[R]egulations have the potential of affecting newcomers more perversely than old-timers. . . . This observation reveals regressive regulatory barriers.”).

11. See Victor Fleischer, *Regulatory Arbitrage*, 89 TEX. L. REV. 227, 280 (2010) (“Firms that can better manage transaction costs can better manage regulatory costs, shifting the burden of those regulatory costs on to those that cannot.”).

12. See, e.g., ORG. FOR ECON. CO-OPERATION & DEV., REGULATORY REFORM AND INNOVATION 19, <https://www.oecd.org/sti/inno/2102514.pdf> [<https://perma.cc/S994-R9PV>]. For example, a long-term international study by the Organization for Economic Co-operation and Development (OECD) found that far fewer patents were issued for telecommunications innovations in countries where the telecommunications industry is subject to more regulation—Germany and France—as compared to countries where telecommunications are subject to greater competition—the United States and Japan. See *id.*

13. See *infra* Part IV.

14. See *infra* Part V.

This requires a more detailed analysis of the impact of complex standards, simple standards, simple rules, and complex rules.

Complex standards are especially burdensome for startups and are likely to have the highest impact on entrepreneurial innovation.¹⁵ This is because the cost of compliance with complex standards exhibits strong economies of scale.¹⁶ This economic effect gives large incumbents a significant advantage over small startups.

Simple standards are not much better for most small businesses, insofar as the regulator's discretion and the resulting uncertainty make it difficult to develop off-the-rack solutions to regulatory problems.¹⁷ Some startups, however, sometimes engage in what Jordan Barry and Elizabeth Pollman term "regulatory entrepreneurship," where startups enter a legal gray area with the specific intent of clarifying or changing the law in a way that favors their business model.¹⁸ But this technique only works for startups that are highly scalable, closely connected to customers, and have mass appeal.¹⁹

Simple rules, unlike simple standards, can often be made to be equally burdensome for startups and incumbents. Simple rules are, by definition, easy to understand and comply with. There is no great advantage to having much experience in dealing with regulation by simple rules. Access to regulators, for example, is of little use where rules are straightforward enough to be equally enforced. Richard A. Epstein also noted that simplifying rules decreases error costs of getting the rule wrong, and that simple rules tend to be the most efficient.²⁰

Complex rules, on the other hand, demand some expensive analysis, at least the first time they are encountered.²¹ Over time, complex rules can

15. See, e.g., *supra* notes 10–11 and accompanying text.

16. See *infra* Part IV.

17. See Elizabeth Pollman & Jordan M. Barry, *Regulatory Entrepreneurship*, 90 S. CAL. L. REV. 383, 392 (2017).

18. *Id.* (“[S]ome companies pursue a line of business that has a legal issue at its core—a significant uncertainty regarding how the law will apply to a main part of the business operations, a need for new regulations in order for products to be feasible or profitable, or a legal restriction that prevents the long-term operation of the business. For these entrepreneurs, political activity is generally a major component of their business models. Essentially, these companies are in the business of trying to change or shape the law. We term such businesses ‘regulatory entrepreneurs,’ and this class of business activity ‘regulatory entrepreneurship.’”).

19. See *id.* at 442–47.

20. See RICHARD A. EPSTEIN, *SIMPLE RULES FOR A COMPLEX WORLD* 21–36 (1995). In economic terms, there is a “great trade-off . . . between social incentives and administrative costs” and legal systems should “minimize the sum of administrative (including error) costs and the costs associated with the creation of poor incentives for individual action.” *Id.* at 30, 32.

21. Cf. Eyal-Cohen, *supra* note 10, at 874.

be figured out.²² This advantages larger and older firms, which encounter the same rules time and again.²³ This would indeed lead to a disparate negative impact on small and young firms—entrepreneurs.²⁴

Complex rules would have a disparate impact on startups, except that technology can disrupt the boundaries of a firm. Innovative regulatory products make it easier to “rent” than “buy” compliance solutions.²⁵ The technological innovation of “regulatory democratizations” makes regulatory information and compliance costs accessible for a wider range of startups and small businesses.²⁶ Entrepreneurial innovations of these regulatory compliance solutions are identified in *The Startup Study*²⁷ and are described in the case studies in this Article.²⁸

To put this another way, technology reduces the errors and administrative costs of complex rules. As a result of regulatory democratization, complexity of rules is less problematic where technology has made it relatively easy to comply, even with very complex rule-type regulations.²⁹ The case studies show six of these innovative responses to regulatory challenges, where technology has enabled scalable solutions to regulatory compliance problems that make the impact of certain regulations less disparate upon startups.³⁰

This Article is not the first to recognize that regulations have a disparate impact upon startups, but its new finding of regulatory democratization contributes to the conversation on how to make regulations that encourage entrepreneurial innovation. In particular, regulatory democratization sheds new light on three proposed policy changes.

A current hot topic in the regulatory literature is to create “regulatory sandboxes.”³¹ These sandboxes should be called regulatory sand traps because they are going to mire startups in the shifting sands of vague standards and

22. *See id.*

23. *See id.* at 872–74.

24. *Cf.* Carol Goforth, *Securities Treatment of Tokenized Offering Under U.S. Law*, 46 PEPP. L. REV. 405, 410 (2019) (noting the disparate impact of aggressive regulation on startups in the cryptotransaction sphere).

25. *See infra* Part III.

26. *See infra* Part III.

27. *See infra* Part II.

28. *See infra* Part III.

29. *See infra* Section IV.B.3.

30. *See infra* Part III.

31. *See The Role of Regulatory Sandboxes in Fintech Innovation*, FINEXTRA, (Sept. 10, 2018), <https://www.finextra.com/blogposting/15759/the-role-of-regulatory-sandboxes-in-fintech-innovation> [<https://perma.cc/Q28F-Y2SQ>]; *infra* Section V.A. *See generally* Hillary J. Allen, *Regulatory Sandboxes*, 87 GEO. WASH. L. REV. 579 (2019).

vast regulatory discretion. Admission to regulatory sandboxes is entirely up to the regulator's discretion,³² and this advantages companies that have relationships with regulators.³³ That tends to be old and large companies.³⁴ Moreover, since the sandboxes have no rules of which to speak, it is impossible to create any type of technological approach to this particular regulatory apparatus.³⁵

Another proposal is to mandate information sharing between competitors' regulated networks.³⁶ In addition to the obvious antitrust issues presented by requiring competitors to share competitively sensitive information, this proposal is sure to backfire. Moreover, practical questions remain unresolved. How would such an information sharing network be enforced? What would be the cost of incentivizing competitors to share appropriate information? Who even knows what is the right information to share? This game is not worth the candle.

Tax incentives, however, for startups might be worth exploring further. Tax rules and potential tax savings through them can be made available to small businesses and even individual proprietors. Thanks to technological solutions to tax problems, information about potential tax savings can be shared and even incorporated into business planning fairly easily. Tax breaks for startups in their early years and for small businesses throughout their lifetimes could offset the disparate impact of regulatory costs and encourage entrepreneurial innovation.

In conclusion, this Article finds that regulations can and should be designed to encourage entrepreneurial innovation, by focusing on making regulatory compliance equal in cost for firms large and small, young and old. On the horizon are new tools for measuring the impact of regulation. This Article theorizes that rules and standards will have a very different impact on regulation, and this variable should be considered in regulatory empirical analysis.

II. THE STARTUP STUDY

The discovery of regulatory democratization arose through The Startup Study. The author of this article spent two years conducting this fieldwork study that was designed to generate and develop theories about the impact of law and regulation on entrepreneurship and innovation. While most scholars seem to agree that the laws are not optimal for entrepreneurship,³⁷

32. See *The Role of Regulatory Sandboxes in Fintech Innovation*, *supra* note 31.

33. See Allen, *supra* note 31, at 589.

34. See *id.* at 588–89.

35. See *id.* at 641–42.

36. See *infra* Section V.B.

37. See *supra* notes 9–11, 15–24 and accompanying text.

there is almost nothing published on the impact of regulation on startup innovation. The Startup Study was designed to categorically address this issue at its largest scale.

Setting aside conclusory and somewhat political claims either that regulations harm innovation and should be limited to ex post enforcement,³⁸ or that the free market is dangerous to society at large and should be controlled by the federal government,³⁹ there are very few law review articles discussing the impact of regulations on innovation generally⁴⁰ or

38. See, e.g., Arch G. Woodside, Man-Ling Chang & Cheng-Feng Cheng, *Government Regulations of Business, Corruption, Reforms, and the Economic Growth of Nations*, 11 INT'L J. BUS. & ECON. 127, 128 (2012) (“The claim appears frequently in the United States that government regulations stifle business growth.”); see also, e.g., STEVE FORBES & ELIZABETH AMES, *HOW CAPITALISM WILL SAVE US: WHY FREE PEOPLE AND FREE MARKETS ARE THE BEST ANSWER IN TODAY’S ECONOMY* xi (2009) (“Government is good at maintaining order. But it lacks the imagination and creativity to produce the kind of innovations that have always created jobs and driven genuine growth.”); Marc Bourreau & Pinar Doğan, *Regulation and Innovation in the Telecommunications Industry*, 25 TELECOMM. POL’Y 167, 168 (2001) (“Generally, regulation can affect these innovative activities via two different channels. Firstly, price regulations (or more specifically, the regulation of interconnection charges and retail prices) alter industry profits, hence the incentives to innovate. Secondly, both price and entry regulations change the terms of entry, and hence innovation decisions regarding new entry.”); Stephan J. Goetz, Richard C. Ready & Brad Stone, *U.S. Economic Growth vs. Environmental Conditions*, 27 GROWTH & CHANGE 97, 97 (1996) (“Economists generally agree that environmental regulations reduce economic growth. Standard analysis reveals a shift in the supply curve to the left as firms comply with regulations, leading to reduced output at higher prices[.]”).

39. See generally Joseph E. Stiglitz, *Government Failure vs. Market Failure: Principles of Regulation*, in GOVERNMENT AND MARKETS: TOWARD A NEW THEORY OF REGULATION 13, 13, 15–16 (Edward J. Balleisen & David A. Moss eds., 2009) (“The notion that markets, by themselves, lead to efficient outcomes has, in short, no theoretical justification . . .”).

40. Much of the legal scholarship on regulation and innovation deals with specific regulations. Indeed, a substantial portion of it pertains to antitrust or patent law. For example, excellent papers have been written on the impact of mandatory unbundling of telecommunications networks on innovation in incumbent local exchange carriers, see, e.g., Thomas M. Jorde, J. Gregory Sidak & David J. Teece, *Innovation, Investment, and Unbundling*, 17 YALE J. ON REG. 1 (2000), or the impact of government power to enjoin mergers on innovation in business models, see, e.g., Rachel S. Tennis & Alexander Baier Schwab, *Business Model Innovation and Antitrust Law*, 29 YALE J. ON REG. 307, 308–10, 348–50 (2012) (recommending policy reform for mergers between firms with innovative business models). It is unsurprising that discussions about entrepreneurship should come up in the literature on competition law and policy, whose design is to foster innovation. Likewise, the impact on innovation comes up in the patent context in large part because patent law is supposed to incentivize innovation by granting a temporary monopoly to the innovator. See Talya Ponchek, *The Emergence of the Innovative Entity: Is the Patent System Left Behind?*, 16 J. MARSHALL REV. INTELL. PROP. L. 66, 71, 84, 112 (2016). However,

scientifically.⁴¹

For these reasons, the Author, and co-investigators Liya Palagashvili⁴² and Richard A. Epstein,⁴³ proposed a research project called The Startup Study: The Impact of Regulation on Innovation. The researchers received a grant from the John Templeton Foundation to interview founders, funders, and other startup market participants about their experiences with regulations; create qualitative datasets about our findings from these interviews; publish scholarship based on the analysis of our findings; develop and issue a quantitative survey based on our qualitative findings; and analyze and publish articles on both the qualitative findings and the quantitative results from the survey. The Startup Study thus seeks to fill voids in the law and entrepreneurship literature through its combination of theoretical and qualitative approaches. This Article reflects the primary legal findings from the qualitative phase of The Startup Study.

regulations beyond those intended to directly affect incentives to innovate often have an indirect impact on entrepreneurial innovation.

41. The entrepreneurship literature is still developing with regard to the impact of regulation on startup innovation. In this literature, the impact of regulation on entrepreneurship is often accounted for only indirectly by its composition within more general or only partially overlapping factors such as industry uncertainty. While it is generally acknowledged that government, law, and regulation impact a startup's entry—the impact of regulation on entrepreneurship—much of the scholarly attention in the entrepreneurship literature has instead focused on intrinsic factors such as the individual characteristics of entrepreneurs—risk preferences—or non-regulatory industry factors such as industry advertising intensity, industry density, and industry profitability. See Stephanie A. Fernhaber, Patricia P. McDougall & Benjamin M. Oviatt, *Exploring the Role of Industry Structure in New Venture Internationalization*, 31 ENTREPRENEURSHIP THEORY & PRAC. 517 (2007) (providing a comprehensive literature review that defined nearly twenty industry structure variables—none of which pertain to industry regulation); see, e.g., Thomas J. Dean & G. Dale Meyer, *Industry Environments and New Venture Formations in U.S. Manufacturing: A Conceptual and Empirical Analysis of Demand Determinants*, 11 J. BUS. VENTURING 107 (1996) (industry structure's impact on new venture formation); Patricia P. McDougall, Richard B. Robinson, Jr. & Angelo S. DeNisi, *Modeling New Venture Performance: An Analysis of New Venture Strategy, Industry Structure, and Venture Origin*, 7 J. BUS. VENTURING 267 (1992) (industry structure's impact on new venture performance); Patricia Phillips McDougal et al., *The Effects of Industry Growth and Strategic Breadth on New Venture Performance and Strategy Content*, 15 STRATEGIC MGMT. J. 537 (1994) (industry structure's impact on new venture strategic behavior); William R. Sandberg & Charles W. Hofer, *Improving New Venture Performance: The Role of Strategy, Industry Structure, and the Entrepreneur*, 2 J. OF BUS. VENTURING 5, 5–28 (1987) (industry structure's impact on new venture performance).

42. Liya Palagashvili, Assistant Professor of Economics, State University of New York-Purchase; Research Fellow and Program Affiliate Scholar, The Classical Liberal Institute at New York University.

43. Richard A. Epstein, Laurence A. Tisch Professor of Law and Director of the Classical Liberal Institute at New York University, James Parker Hall Professor of Law Emeritus and Senior Lecturer at the University of Chicago, and Peter and Kirsten Bedford Senior Fellow at the Hoover Institution.

The Startup Study began with a qualitative phase in which the main goal was theory development. To achieve this research goal, the researchers selected unstructured interviews as a research tool. The use of unstructured interviews for the purpose of theory development is well-established in the anthropology and sociology literatures.⁴⁴ Fieldwork appears to be much less common in the legal literature; however, there are precedents for the use of unstructured interviews for qualitative analysis in legal scholarship as well.⁴⁵

The unstructured interview technique is a well-established means of understanding the complex behavior of people without imposing any a priori categorization.⁴⁶ This approach allowed The Startup Study to begin with a broad scope of inquiry designed to maximize potential for theory development. Fieldwork researchers followed best practices to promote consistency across the interview sessions, including the establishment of *aide memoire* by setting an agenda of topics that might be covered in the interviews.⁴⁷

From May 2017 to December 2017, fieldworkers Dr. Liya Palagashvili and Seth C. Oranburg traveled across the United States⁴⁸ and interviewed

44. See, e.g., Yan Zhang & Barbara M. Wildemuth, *Unstructured Interviews, in APPLICATIONS OF SOCIAL RESEARCH METHODS TO QUESTIONS IN INFORMATION AND LIBRARY SCIENCE* 222, 223–24 (Barbara M. Wildemuth ed., 2009) (“Unstructured interviews can be very useful in studies of people’s information seeking and use. They are especially useful for studies attempting to find patterns, generate models, and inform information system design and implementation.” “[T]he purpose of inquiry is theory development rather than theory testing.”).

45. See, e.g., Stewart Macaulay, *Lawyers and Consumer Protection Laws*, 14 L. & SOC’Y REV. 115 (1979) (conducting qualitative research through unstructured interviews of approximately 100 lawyers from across five Wisconsin counties to learn about the impact of the Magnuson-Moss Warranty Act on the practice of law, 15 U.S.C. §§ 2301–2312 (2018)); Jean Braucher, *Lawyers and Consumer Bankruptcy: One Code, Many Cultures*, 67 AM. BANKR. L.J. 501 (1993) (conducting qualitative research through unstructured interviews of consumer debt lawyers, chapter 13 trustees, and other participants in the bankruptcy system).

46. KEITH F. PUNCH, *INTRODUCTION TO SOCIAL RESEARCH: QUANTITATIVE AND QUALITATIVE APPROACHES* 185–86 (1998).

47. See generally ROBERT G. BURGESS, *IN THE FIELD: AN INTRODUCTION TO FIELD RESEARCH* 108 (Martin Bulmer ed., 1984); Charles Briggs, *Interview*, 9 J. LINGUISTIC ANTHROPOLOGY 137, 137–38 (2000); Terence McCann & Eileen Clark, *Using Unstructured Interviews with Participants Who Have Schizophrenia*, 13 NURSE RESEARCHER 7, 11–13 (2005).

48. To provide a national scope for The Startup Study, interviews were conducted in Austin, Texas; Boston, Massachusetts; the Denver-Boulder Metro Area, Colorado; Los Angeles, California; the Miami Metro Area, Florida; New York City, New York; Omaha,

eighty-eight participants in the domestic startup ecosystem. Of these, forty-five were with startups, twelve were with investors, and twenty-one were with other startup market participants. In addition, these researchers also traveled internationally and interviewed startups in Israel and London.⁴⁹

Subjects were chosen via four methods: geographical sampling,⁵⁰ judgment sampling,⁵¹ opportunity sampling,⁵² and snowball sampling.⁵³ Researchers contacted these subjects via phone, email, LinkedIn, Twitter, Facebook, and other social media platforms and requested a one-hour in-person interview. Most interviews were indeed conducted on-site and in-person, although a few were conducted by conference call or teleconference platforms, such as Zoom or Skype.

Nebraska; Pittsburgh, Pennsylvania; the San Diego Metro Area, California; and the Silicon Valley-San Francisco Metro Area, California.

49. International interviews included: eleven in Tel Aviv; eight in Jerusalem; two in other regions of Israel; and eleven in London, UK.

50. Researchers created a list of startup hub cities based on multiple lists of top cities for startups published by institutions such as the Kauffman Foundation for Entrepreneurship and trade publications such as Inc. Magazine, Entrepreneur, etc. See ROBERT FAIRLIE, ARNOBIO MORELIX & INARA TAREQUE, EWING MARION KAUFFMAN FOUND., 2017 KAUFFMAN INDEX OF STARTUP ACTIVITY: METROPOLITAN AREA AND CITY TRENDS 9–13 (2017), https://www.kauffman.org/wp-content/uploads/2019/09/2017_Kauffman_Index_Startup_Activity_Metro_Report_Final.pdf [<https://perma.cc/Q6U4-H8VN>]; Emily Canal, *The 10 Hottest Startup Cities in America*, INC (Aug. 14, 2019), <https://www.inc.com/emily-canal/top-10-cities-successful-businesses-2019-inc5000.html> [<https://perma.cc/7EEP-3GRY>]; Angela Ruth, *The Top 7 Cities Competing with Silicon Valley for Tech Entrepreneurs*, ENTREPRENEUR (Aug. 24, 2017), <https://www.entrepreneur.com/article/299173> [<https://perma.cc/F4XJ-727X>]. Researchers then used CrunchBase Pro—a proprietary database of startups that contains details including the names and emails of founders and executives—to search for startups in those cities that met the chosen criteria. See generally CRUNCHBASE, <https://www.crunchbase.com> [<https://perma.cc/7VX6-D46H>]. Criteria included: privately held, technology startups, less than seven years old, that had received outside funding but had not passed the Series C stage. From this list, researchers and their staff cold called, emailed, and sent LinkedIn messages to these executives and founders. They then described The Startup Study and requested a live interview on specific dates when the fieldworkers would be in that city. If these initial efforts did not generate a response, the researchers leveraged personal connections and networking to secure interviews.

51. Researchers sought out specific firms in targeted cities that were well-known for being influential in the startup marketplace. Judgement sampling led researchers to seek out interviews with venture capital firms, accelerators, and incubators that are known to be key players in local and national startup ecosystems.

52. Researchers spent a considerable amount of time in each city, where they attended startup events related to The Startup Study. At some of these events, the researchers met founders and executives of startups who were not initially identified through the geographic sampling, but who expressed knowledge about the impact of regulation on startups. Researchers took these fortunate meetings as opportunities to conduct additional interviews.

53. After some interviews, interviewees offered to connect the researchers with other potential interviewees. Prior to accepting this invitation, researchers determined whether these proposed connections would make a valuable contribution to The Startup Study. If so, researchers followed up with a subsequent interview based on this snowball effect.

Almost all the interviews were recorded for further analysis, except in a few cases where the interviewee requested that the interview not be recorded. After each interview, a research assistant read the researcher's interview notes, listened to the recording,⁵⁴ and drafted a memorandum that identified the key issues, the topics addressed, and details that were discussed. The research assistant also provided some suggestions for further investigation. The researchers then reviewed each of the memoranda and compiled them into five distinct datasets: GenTech,⁵⁵ FinTech,⁵⁶ MedTech,⁵⁷ Israel, and London.

To encourage the interviewees to speak frankly about their experiences, the researchers agreed to maintain their confidentiality. Accordingly, the people interviewed are not identified in this Article. However, a common

54. In the very few cases where a recording was not available, notes taken during the interview were later expanded and refined by the interviewer.

55. GenTech—as used in this article—refers to general technology firms, which includes most technology startups—software, IT, database, B2B, media, social networks, artificial intelligence, etc. A key criterion for GenTech is the absence of any highly specific or especially onerous regulations. GenTech startups and small businesses are still subject to general regulations such as employment, immigration, patent, tax, etc. See Daniel McKenzie, *Startup Law A to Z: Regulatory Compliance*, EXTRA CRUNCH (Apr. 4, 2019, 12:17 PM), <https://techcrunch.com/2019/04/04/startup-law-a-to-z-regulatory-compliance/> [<https://perma.cc/A86J-PW5X>].

56. FinTech references financial technology firms, which include blockchain, crowdfunding, cryptocurrency, insurance, microfinance, payment systems, and robo-trading companies. See Julia Kagain, *Financial Technology – Fintech*, INVESTOPEDIA (June 25, 2019), <https://www.investopedia.com/terms/f/fintech.asp> [<https://perma.cc/D5RA-4SL5>]. FinTech firms generally have to deal with additional regulations from the Financial Industry Regulatory Authority (FINRA), the Securities and Exchange Commission (SEC), and state financial regulators. See *id.*

57. MedTech refers to firms that require FDA approval prior to selling products in the U.S. market. See Scott Gottlieb, *Advancing Policies to Promote Safe, Effective MedTech Innovation*, FDA (Dec. 11, 2018), <https://www.fda.gov/news-events/fda-voices/advancing-policies-promote-safe-effective-medtech-innovation> [<https://perma.cc/FL7S-FN7T>]; Kevin O’Keeffe, *The Rise of Medtech*, MDDI (June 10, 2011), <https://www.mddionline.com/rise-medtech> [<https://perma.cc/HDP9-M33F>]. This includes Class II medical devices and Class III pharmaceuticals. See O’Keeffe, *supra*; *Classify Your Medical Device*, FDA, <https://www.fda.gov/medical-devices/overview-device-regulation/classify-your-medical-device> [<https://perma.cc/3BFP-5ZWP>]. It does not include “digital health” companies like Fitbit who make devices that relate to health but do not claim to treat any particular disease or medical condition. See *FDA Says It Won’t Regulate FitBit, Many Other Fitness Wearables*, ADVISORY BOARD (Aug. 18, 2016, 8:17 AM), <https://www.advisory.com/daily-briefing/2016/08/18/fda-says-it-wont-regulate-fitbit> [<https://perma.cc/A7EQ-KTAX>]. See generally CTR. FOR DEVICES & RADIOLOGICAL HEALTH, U.S. FOOD & DRUG ADMIN., GENERAL WELLNESS: POLICY FOR LOW RISK DEVICES (2019), <https://www.fda.gov/media/90652/download> [<https://perma.cc/V8MS-55JW>].

thread that wove throughout their stories was their use of technology to comply with certain regulations. But for that technology, competition in that regulated industry would be impossible. This Article will now focus on that technology, which it terms “regulatory democratizations.”

III. REGULATORY DEMOCRATIZATIONS

Discovering the phenomenon of regulatory democratizations was a primary finding of The Startup Study. This Section will first define and discuss regulatory democratization (RD) in general. Then it will present case studies of companies engaging in RD as specific illustrations of the general concept.

RDs are technological solutions for regulatory compliance problems. RD only arises in regulated industries where technology is able to make regulatory compliance cheaper for a large number of firms. In other words, companies will develop RD products when they can sell scalable compliance solutions, and companies will purchase RD technologies when they can make regulatory compliance more affordable.

RD seems to depend on new technologies that have only recently become available. The startups described below are powered by virtual servers, artificial intelligence, and other cutting-edge technologies. In particular, the general availability of cloud computing power seems essential for RD. The common thread binding these necessary technologies together is that they all make it easier to enter new markets and scale up production. For example, cloud computing makes it easy to “rent” instead of “buy” processing power.⁵⁸

RD companies use this processing power to further make it cheaper for small firms to “rent” compliance solutions, instead of “buying” complex and customized solutions for each firm. Lowering the “rental” cost of regulatory compliance makes compliance affordable for more young and small companies. RD thus mitigates some of the disparate impact of regulatory burdens faced by entrepreneurs. In this way, RD can have a dramatic effect on regulated markets by facilitating entry and competition—so long as underlying regulations are computable.

RD is distinct from traditional regulatory consulting services. In the traditional model, a consulting firm provides customized professional advice to a single individual or an organization for a fee.⁵⁹ Consultancy may include

58. See Steve Ranger, *What is Cloud Computing? Everything You Need to Know About the Cloud, Explained*, ZDNET (Dec. 13, 2018, 12:24 PM), <https://www.zdnet.com/article/what-is-cloud-computing-everything-you-need-to-know-from-public-and-private-cloud-to-software-as-a/> [<https://perma.cc/B5LQ-6TH8>].

59. See, e.g., ACCESTRA, <https://www.accestra.com> [<https://perma.cc/6WYH-FML3>]; *Regulatory Affairs*, BEAUFORT, <https://www.beaufortcro.com/regulatory-affairs> [<https://perma.cc/Y7EC-Y9KT>].

advice on strategy, operations, management, taxation, human resources, etc.⁶⁰ Traditional regulatory consulting is the analogue to the digital solution of RD.

A regulatory consulting firm provides customized advice as to how an individual or firm can navigate a given regulation. Further, these consulting firms have a distinct comparative advantage⁶¹ in assessing, analyzing, and digesting regulatory information. Due to the principle of microeconomic specialization,⁶² they are better suited to distill this information and tailor legal strategies for other firms, rather than a firm trying to navigate the applicable regulation regime in-house.

For example, NAMSA is a medical research organization that helps firms comply with FDA regulations.⁶³ An organization can hire NAMSA to provide a risk assessment of whether a new medical device is likely to be considered a biological risk under, for example, ISO 10993-1 or the EU Medical Device Directive.⁶⁴ For these services, a firm like NAMSA might charge up to \$1,000 per hour.⁶⁵

60. See Jennifer Wilson, *Consulting Services Can Grow Your Firm—if Managed Properly*, J. ACCT. (Mar. 7, 2016), <https://www.journalofaccountancy.com/newsletters/2016/mar/consulting-services-can-grow-firm.html> [<https://perma.cc/XWF2-89C3>].

61. David Ricardo expanded on Adam Smith's theory of absolute advantage. See DAVID RICARDO, *ON THE PRINCIPLES OF POLITICAL ECONOMY, AND TAXATION* 66, 388–402 (3d ed. 1821). Ricardo argued that even if a country has an absolute advantage in producing both goods, the other may have a comparative advantage and should produce the good associated with the lower opportunity cost to increase economic welfare. *Id.*

62. Firms that are better suited to analyze regulation regimes have an endogenous comparative advantage because of internal factors such as training, resources, and investments in equipment. These firms can sell their services to other firms, which results in an efficient division of labor and microeconomic specialization. Sherwin Rosen, *Substitution and Division of Labour*, 45 *ECONOMICA* 235, 235 (1978) (“[T]he packaging of work activities into bundles is itself the endogenous outcome of economic decisions.”).

63. See *Our History: From CRO to MRO*, NAMSA, <https://www.namsa.com/our-history> [<https://perma.cc/B9WF-B8WQ>].

64. See *Medical Device Regulatory Consulting*, NAMSA, <https://www.namsa.com/services/consulting/regulatory> [<https://perma.cc/XC4Q-V2K7>]; *Biological Safety Services*, NAMSA, <https://www.namsa.com/services/testing/biological-safety-services> [<https://perma.cc/WXJ6-8TQJ>]; *EU MDR & IVDR Planning Resources*, NAMSA, <https://www.namsa.com/mdr-ivdr-resources> [<https://perma.cc/79YZ-N4WX>].

65. Hanh Nguyen, *How Much Should You Pay for a Compliance Consultant?*, LINKEDIN (Aug. 31, 2018), <https://www.linkedin.com/pulse/how-much-should-you-pay-compliance-consultant-hanh-nguyen/> [<https://perma.cc/5GJM-SRWK>].

Due to such high fees, many startups and small businesses, especially ones that “run lean,”⁶⁶ cannot afford to hire traditional regulatory consultants. With the option of compliance off the table, startups and small businesses are left with two options: proceed with the development of a product that might not comply with regulations or abandon the project completely. Accordingly, some startups begin their life in willful ignorance or even deliberate violation of regulatory requirements, while other small businesses are stillborn in regulatory limbo.

RD solves the dilemma of unaffordable noncompliance by offering a way for startups and small businesses to comply with regulations affordably. Unlike a traditional consulting firm, which offers customized expertise to individual organizations at a relatively high price,⁶⁷ an RD firm offers a technological solution that can be employed by a large number of startups for a relatively low price. To accomplish this, RD firms’ business models rely on economies of scale.⁶⁸

RD is thus distinct from the traditional regulatory consultancy. Traditionally, a consulting firm prepares a customized regulatory solution for a unique client at a high cost.⁶⁹ A customized solution may include expensive long-term political investments, such as lobbying and hobnobbing with regulators.⁷⁰ Accordingly, only large and longstanding firms could afford regulatory consultancy. Now, under RD, technologies offer scalable solutions to regulatory problems for a large number of firms. Unlike traditional consulting firms, which are generally too expensive for small firms to employ, RD firms offer scalable regulatory compliance solutions that are affordable and sometimes even free for the smallest firms. Thus, RD makes it easier for small and young firms to compete with large and old ones.

Technological solutions that work for a wide range of startups and small businesses are not easy to create. If they were, then traditional consulting

66. For a discussion on the lean startup model, see Steve Blank, *Why the Lean Start-Up Changes Everything*, HARV. BUS. REV. (May 2013), <https://hbr.org/2013/05/why-the-lean-start-up-changes-everything> [<https://perma.cc/VL2E-V2YY>].

67. See *supra* notes 59–65 and accompanying text.

68. The concept of economies of scale dates back as far as Adam Smith, who explained how the division of labor can result in lower costs of production. See Reem Heikal, *What Are Economies of Scale?* INVESTOPEDIA (Aug. 14, 2019), <https://www.investopedia.com/insights/what-are-economies-of-scale> [<https://perma.cc/22NN-HY3E>]. A simple example of economies of scale in ordinary life is the lower costs a consumer incurs when buying in bulk. *Id.* In general, as a good or service becomes more standardized, or “commoditized,” that commodity becomes less expensive. See *id.*

69. See Soren Kaplan, *The Business Consulting Industry Is Booming, and It’s About to Be Disrupted*, INC. (Sept. 11, 2017), <https://www.inc.com/soren-kaplan/the-business-consulting-industry-is-booming-and-it.html> [<https://perma.cc/C4AE-H5R7>].

70. See, e.g., *Public Policy & Regulation*, HOLLAND & KNIGHT, <https://www.hklaw.com/en/services/practices/regulatory-and-government-affairs/public-policy-regulation> [<https://perma.cc/7FG7-FLT7>].

firms would be obsolete. Yet the traditional consulting industry is clearly necessary, as evidenced by the fact that it generates about \$506 billion in annual revenues.⁷¹ However, technology, especially cloud computing and artificial intelligence (AI), is making technological RD solutions more feasible.

RD not only changes how much regulatory costs are incurred by small business. RD also changes when those costs are incurred. By transforming up-front costs to pay-as-you-go costs, RD makes it much easier to run a cash-strapped small business in a highly regulated environment.

Traditional regulatory costs—such as paying a consultant to determine whether a proposed product would be in compliance with a given regulation—are incurred up front.⁷² Costs for FDA pharmaceutical trials, for example, are incurred before the first pill is sold.⁷³ To afford the massive up-front costs, many pharmaceutical companies try to raise billions of dollars via an initial public offering in order to finance drug trials.⁷⁴

Startups and small businesses that lack access to capital markets find it very difficult to pay such huge up-front costs.⁷⁵ Entrepreneurs may decide not to enter a market where the initial price of admission is too high.

71. *Consulting Industry Market Research*, PLUNKETT RES., <https://www.plunkettresearch.com/industries/consulting-market-research> [<https://perma.cc/32EE-GJHF>].

72. *See Consulting Fees and Rates: How Much Should I Charge?*, CONSULTING, <https://www.consulting.com/consulting-fees-rates> [<https://perma.cc/9S3A-N3LW>].

73. *See* Matthew Herper, *The Cost of Developing Drugs is Insane. That Paper That Says Otherwise is Insanely Bad*, FORBES (Oct. 16, 2017, 10:58 AM), <https://www.forbes.com/sites/matthewherper/2017/10/16/the-cost-of-developing-drugs-is-insane-a-paper-that-argued-otherwise-was-insanely-bad/#23cecea82d45> [<https://perma.cc/W2RN-QYAT>].

74. *See generally* DAVID THOMAS & CHAD WESSEL, BIO, 2019 EMERGING THERAPEUTIC COMPANY TREND REPORT (2019), <http://go.bio.org/rs/490-EHZ-999/images/BIO%202019%20Emerging%20Company%20Trend%20Report.pdf> [<https://perma.cc/9679-TPGM>]. It is well-known in the industry that pharmaceutical companies

are highly dependent on access to capital. For early-stage private companies, the majority of this investment comes in the form of venture capital until the eventual listing on a public exchange. This initial public offering is the first of what can be many rounds of financing from public investors through follow-on public offerings, financings that can provide timely access to capital after key clinical or regulatory milestones.

Id. at 4.

75. *See* Michael R. Wade & Jialu Shan, *The Battle for Digital Disruption: Startups v. Incumbents*, IMD (Mar. 2016), <https://www.imd.org/research-knowledge/articles/the-battle-for-digital-disruption-startups-vs-incumbents> [<https://perma.cc/ZX5W-KNZ6>]. There are at least two reasons why fixed costs have a disparate impact on startups versus incumbents. *See id.* First, the startup generally needs to pay that cost with debt or equity, whereas an incumbent also has the option of paying via cash flows. *See id.* Second, startups have more

Yet, RD provides an alternative to raising capital to “buy” compliance at a high up-front cost. RD can transform a high initial cost into a lower but ongoing cost. In other words, RD transforms up-front, fixed regulatory costs into ongoing, variable regulatory costs. Such technologies can make it possible for smaller and younger companies to compete with larger and older ones. To put this in terms of economics, RD technology flattens the average cost curve of regulatory compliance. This makes a more level playing field for competition between large and small firms in highly regulated markets.

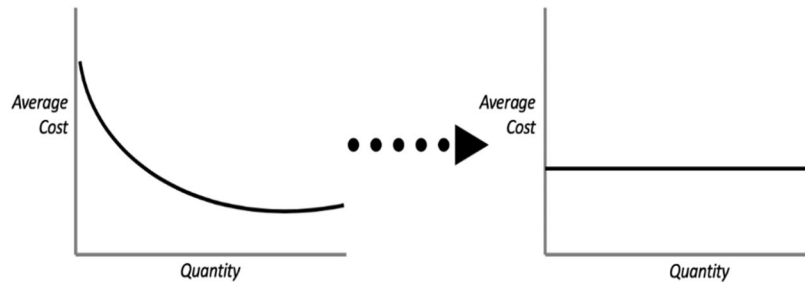


Figure 1. Regulatory democratization “flattens” the average cost curve of regulatory compliance. Without regulatory democratization, this curve has economies of scale that advantage larger firms, who spread the cost of compliance over a greater quantity of goods or services sold, over smaller firms.

RD is not entirely new. After all, online forms have helped entrepreneurs save legal costs for decades, and hornbooks also democratize access to the legal process.⁷⁶ One might even argue that the printing press is a technological innovation that enabled a sort of fifteenth century RD.⁷⁷

But this Article argues that the use of cloud computing and artificial intelligence technologies has enabled RD to make a higher degree of impact on competition in highly regulated industries.

Next, this Part will introduce five case studies of startups that offer RD technologies—Paubox, AirMap, Avalara, Cognigo, and Metomic. In addition, Amazon Web Services provides compliance technologies for these and other regulations, and it forms the hardware backbone for many startups’

uncertainty as to whether they will succeed in a new market, as compared with incumbents who have greater certainty as to whether they will continue to operate in an existing market. The uncertainty of return on investment for startups adds to their cost. *See id.*

76. *See* Daniel W. Linna, Jr., *What We Know and Need to Know About Legal Startups*, 67 S.C. L. REV. 389, 394–95, 410 (2016).

77. *See generally* Steven Kreis, *The Printing Press*, HIST. GUIDE (May 2, 2016), <http://www.historyguide.org/intellect/press.html> [<https://perma.cc/78GJ-2EL5>].

software solutions, including RD.⁷⁸ The startups described below were not necessarily interviewed by the researchers in The Startup Study. However, these startups came to the attention of the researchers through the process of theory development via unstructured interviews with startup market participants.

A. Paubox

Paubox is a startup that developed an RD solution for doctors' offices.⁷⁹ Doctors' offices must comply with many regulations, including the Health Insurance Portability and Accountability Act (HIPAA).⁸⁰ HIPAA regulates the storage and transmission of protected health information (PHI).⁸¹ Essentially, HIPAA requires PHI to be sent in encrypted formats such that doctors' offices generally cannot email patient records without investing tens of thousands of dollars to install and maintain their own secure email servers.⁸²

Paubox was founded in 2015 to offer a solution whereby doctors' office could send secure emails via a simple app called Paubox.⁸³ Instead of paying a huge upfront cost for private email servers, Paubox users pay a low monthly rate, based on their usage.⁸⁴ This makes it much cheaper for small doctors' offices to email PHI, helping small doctors' offices compete on the dimension of patient communication with large healthcare systems that can more easily afford to build their own secure PHI transmission infrastructure.

78. *E.g., Hot AWS EdStart Startups: GlyphEd, Exploros, and WayUp*, AMAZON WEB SERVICES (May 1, 2018), <https://aws.amazon.com/blogs/publicsector/hot-aws-edstart-startups-glyphed-exploros-and-wayup/> [<https://perma.cc/N5SZ-BJX5>].

79. *About Us*, PAUBOX, <https://www.paubox.com/about> [<https://perma.cc/G9BL-7S96>].

80. *See Who Must Comply with HIPAA Privacy Standards*, U.S. DEP'T HEALTH & HUM. SERVICES (Dec. 19, 2002), <https://www.hhs.gov/hipaa/for-professionals/faq/190/who-must-comply-with-hipaa-privacy-standards/index.html> [<https://perma.cc/L7NH-PLH4>].

81. *See What is PHI?* U.S. DEP'T HEALTH & HUM. SERVICES (Feb. 26, 2013), <https://www.hhs.gov/answers/hipaa/what-is-phi/index.html> [<https://perma.cc/XT7A-KKMZ>].

82. *HIPAA Compliance for Email*, HIPAA J., <https://www.hipaajournal.com/hipaa-compliance-for-email> [<https://perma.cc/GW56-JAZQ>]. For an inexhaustive list of HIPAA email compliance costs, see *Best HIPAA Compliant Email Encryption Services*, TOTAL HIPAA COMPLIANCE (May 1, 2019), <https://www.totalhipaa.com/hipaa-compliant-email-encryption-services> [<https://perma.cc/PZ57-CZEL>].

83. *See Paubox HIPAA Compliant Email Demo*, PAUBOX (May 28, 2015), <https://paubox.wistia.com/medias/d17vqybyqog?wvideo=d17vqybyqog> [<https://perma.cc/5QS8-DRFD>].

84. *Paubox Encrypted Email Pricing*, PAUBOX, <https://www.paubox.com/solutions/encrypted-email/pricing> [<https://perma.cc/MK8E-PUTM>].

HIPAA is a typical example of an anachronistic regulation. When HIPAA was passed in 1996, email was far less frequently used as compared to today.⁸⁵ Facsimile, on the other hand, was generally considered a secure transmission method under HIPAA without taking other steps.⁸⁶ As a result, many healthcare organizations relied on fax transmission and eschewed email for many years.⁸⁷

Perhaps this reliance on fax transmission made sense in 1996, but the means of communication have changed significantly since then. For example, in 2000, approximately 12 billion emails were sent per day.⁸⁸ In 2018, approximately 281 billion emails were sent per day,⁸⁹ and estimates suggest that daily email traffic will increase to 306 billion per day in 2020 and to 347 billion per day in 2023.⁹⁰ Meanwhile, many observers recognize that HIPAA is the reason why the healthcare industry continues to rely on archaic fax technology.⁹¹

85. See Jim Grubbs, *E-mail and Instant Messaging*, in 1 THE INTERNET ENCYCLOPEDIA 660, 661 (Hossein Bidgoli ed., 2004), <http://www.encyclopedias.biz/dw/The%20Internet%20Encyclopedia,%20Volume%201.pdf> [<https://perma.cc/4TGC-SA9L>]. In 1996, when HIPAA was passed into law, an average of about 300 million emails were sent every day. *Id.* at 661.

86. See Shifali Arora, Jennifer Yttri & Wendy Nilsen, *Privacy and Security in Mobile Health (mHealth) Research*, 36 ALCOHOL RES. 143, 144 (2014), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4432854/pdf/arc-36-1-143.pdf> [<https://perma.cc/SY8X-ERRJ>] (“At the time these rules were introduced, clinical health information existed primarily in the form of handwritten patient health records. Information generally was shared between care providers over the phone, by fax or in person. Consequently, initial regulations and guidelines focused on the challenges surrounding protecting information in these limited-sharing formats.”).

87. Yvonne Li, *The Slow Disappearance of the Fax Machine in Healthcare*, HEALTH IT EXCHANGE (Dec. 3, 2014, 1:31 PM), <https://web.archive.org/web/20180317190600/https://searchhealthit.techtarget.com/healthitexchange/CommunityBlog/the-slow-disappearance-of-the-fax-machine-in-healthcare> [<https://perma.cc/43WE-ZZ8B>] (“Fax, short for facsimile, involves the transmission of scanned printed material over phone lines, typically to a telephone number connected to a printer or other device. Although fax reliance peaked in the 1980s, which is also when it took off in healthcare offices, its invention dates all the way back to 1843.”).

88. Oliver J. Chiang, *The Decade in Data*, FORBES (Dec. 28, 2009, 6:00 AM), <https://www.forbes.com/2009/12/27/broadband-text-messages-technology-cio-network-data.html#4324c86b5fc3> [<https://perma.cc/5AC6-R7TP>].

89. THE RADICATI GROUP, INC., EMAIL STATISTICS REPORT, 2018-2022 EXECUTIVE SUMMARY 3 (2018), https://www.radicati.com/wp/wp-content/uploads/2018/01/Email_Statistics_Report_2018-2022_Executive_Summary.pdf [<https://perma.cc/V87M-EPXP>].

90. *Id.*; Jessica Clement, *Number of E-mail Users Worldwide 2017-2024*, STATISTA (Mar. 25, 2020), <https://www.statista.com/statistics/255080/number-of-e-mail-users-worldwide> [<https://perma.cc/AHK8-UF2V>].

91. Sophie Haigney, *The Fax Is Not Yet Obsolete*, ATLANTIC (Nov. 18, 2018), <https://www.theatlantic.com/technology/archive/2018/11/why-people-still-use-fax-machines/576070> [<https://perma.cc/L2VA-VG93>].

Part of the reason why healthcare was stuck in the technological stone age was the sheer cost of implementing modern communications solutions that are HIPAA compliant. HIPAA compliance costs create significant overhead, including cyber liability insurance,⁹² technical errors and omissions insurance,⁹³ HIPAA training for new employees and ongoing HIPAA training,⁹⁴ HIPAA audits,⁹⁵ encryption for laptops and other data-related processes,⁹⁶ and other costs.

These costs can be insurmountable for small doctors' offices, which is precisely why Paubox's solution is designed for and adopted by these small businesses. These small doctors' offices appreciate that Paubox's encrypted email is a plug-and-play solution.⁹⁷ Small businesses may not have the technical staff or computing infrastructure for complex adoption, but Paubox makes it easy for small doctors' offices to send PHI via email while complying with HIPAA.⁹⁸ In a world where the fax machine is a dying breed of communication device, Paubox helps small doctors' offices be more competitive with large firms.

Interestingly, Paubox relies on AWS⁹⁹ to provide its HIPAA-compliant email service.¹⁰⁰ AWS is Payment Card Industry (PCI), Sarbanes-Oxley

92. *Cyber Liability: Complying with HIPAA Regulations*, JAMISON (Dec. 31, 2015, 4:03 PM), <https://www.jamisongroup.com/blog/cyber-liability-complying-with-hipaa-regulations.aspx> [<https://perma.cc/H8YS-WXCG>].

93. *Have Clients in Healthcare? Understand the Professional Liability Exposures*, INSUREON (Jan. 12, 2015), <https://www.insureon.com/blog/have-clients-in-healthcare-understand-the-professional-liability-exposures> [<https://perma.cc/K349-WG7T>].

94. *HIPAA Training Requirements*, HIPAA J., <https://www.hipaajournal.com/hipaa-training-requirements> [<https://perma.cc/8FQA-E9CS>].

95. See Perry Price, *The Cost of a HIPAA Audit*, REVATION SYSTEMS (June 1, 2019), <https://revation.com/hipaa-audit-costs> [<https://perma.cc/Q8FF-PASV>].

96. *Mobile Data Security and HIPAA Compliance*, HIPAA J., <https://www.hipaajournal.com/mobile-data-security-and-hipaa-compliance/> [<https://perma.cc/H876-VZF3>].

97. See *Customer Stories*, PAUBOX, <https://www.paubox.com/customers> [<https://perma.cc/PZY2-5CGN>]; Rick Kuwahara, *Paubox Named a High Performer in Three Categories in G2 Crowd's December 2018 Report*, PAUBOX (Dec. 17, 2018), <https://www.paubox.com/blog/paubox-named-a-high-performer-in-three-categories-in-g2-crowds-december-2018-report> [<https://perma.cc/W4AC-HN3F>].

98. See Arianna Etemadiah, *How to Encrypt Your Email and Why You Should*, PAUBOX (Sept. 18, 2017), <https://www.paubox.com/blog/how-to-encrypt-email> [<https://perma.cc/6Q66-7SW2>].

99. See *infra* Section III.F.

100. Evan Fitzgerald, *Paubox Joins Amazon's AWS Partner Network (APN)*, PAUBOX (June 7, 2017), <https://www.paubox.com/blog/paubox-amazon-aws-partner-network> [<https://perma.cc/WEG7-6RHG>].

Act (SOX), and HIPAA compliant.¹⁰¹ So long as AWS/EC2 users write code that does not break compliance, users can scale their business using AWS cloud services.¹⁰² This is an example of how AWS makes it possible for Schumpeterian entrepreneurs—innovators who disrupt existing industries and thereby change market equilibria,¹⁰³ like Hoala Greevy, founder and CEO of Paubox¹⁰⁴—and startups, like Paubox, to compete with large incumbent firms. Paubox would not be able to offer a competitive HIPAA compliant email solution if it had to bear the cost of buying its own web servers.

B. AirMap

AirMap is a startup whose goal is to help make drones part of everyday life by helping drone operators navigate the regulations for low-altitude operation of unmanned aerial vehicles (UAVs).¹⁰⁵ This requires navigating a complex and dynamic web of regulations. The Federal Aviation Administration (FAA) creates reports that are supposed to explain how to comply with the regulations on UAVs,¹⁰⁶ but, through our study, we learned that the rule-making committees do not appreciate dissent from the consensus opinion within the industry. Generally, the committee only listens to major players such as Boeing, which means their reports and recommendations do not reflect the needs and use cases of the UAV community at large.¹⁰⁷

101. AMAZON WEB SERVS., AMAZON WEB SERVICES: RISK AND COMPLIANCE 5 (2017), https://d0.awsstatic.com/whitepapers/compliance/AWS_Risk_and_Compliance_Whitepaper.pdf [perma.cc/7RKP-X7JQ].

102. See *Amazon EC2 FAQs*, AMAZON WEB SERVICES, <https://aws.amazon.com/ec2/faqs> [<https://perma.cc/X9AC-5VZY>]. “EC2” refers to Amazon Elastic Compute Cloud, a “web service that provides secure, resizable compute capacity in the cloud.” *Id.*

103. See JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY 71–75 (Routledge 2010) (1943). Joseph Schumpeter introduced the concept of entrepreneurship in conjunction with the idea of creative destruction in a chapter titled “The Process of Creative Destruction” in his seminal monograph. See *id.*

104. *About Us*, *supra* note 79.

105. Lora Kolodny, *AirMap Raises \$26 Million to Manage Air Traffic as Drone Use Surges*, TECHCRUNCH (Feb. 23, 2017, 4:33 AM), <https://techcrunch.com/2017/02/23/airmap-raises-26-million-to-manage-air-traffic-as-drone-use-surges/> [<https://perma.cc/7FY8-484Y>].

106. See, e.g., MICRO UNMANNED AIRCRAFT SYS. AVIATION RULEMAKING COMM., ARC RECOMMENDATIONS FINAL REPORT (2016), https://www.faa.gov/uas/resources/public_records/media/Micro-UAS-ARC-FINAL-Report.pdf [<https://perma.cc/8KSE-F2NT>] (recommending a regulatory framework for the FAA in the classification and operation of UAVs).

107. See Natalie Kitroeff & David Gelles, *Before Deadly Crashes Boeing Pushed for Law that Undercut Oversight*, N.Y. TIMES (Oct. 27, 2019), <https://www.nytimes.com/2019/10/27/business/boeing-737-max-crashes.html> [<https://perma.cc/KW7Q-7M4V>]; Brian

Since access to the FAA rulemaking process is dominated by a few large incumbent players who do not want the rules to change and do not want innovative startup competitors to be able to try new business models, disruption of the aviation industry by small startups seemed impossible. AirMap, however, provides these small startups with a platform that it terms “collaborate acceleration,” whereby startups may collectively engage in educating a regulatory agency and encourage them to try a more innovative approach.¹⁰⁸ AirMap thus engages in a unique sort of regulatory democratization by making it easier for small startups to influence agency decision-making.

AirMap also builds software that reflects the more common sort of regulatory democratization. Their Discover function allows users to view airspace advisories, airspace requirements, and even weather conditions before flight.¹⁰⁹ “The AirMap Platform includes a Tile Map Service that allows developers to visually display airspace and advisories to pilots as an overlay.”¹¹⁰ They also have a function that allows users to go mobile with airspace mapping via iOS or Android.¹¹¹ According to our interviews, it would be prohibitively expensive for individual drone operators to obtain this information. AirMap lowers the relative cost of compliance for small startups by showing all pilot advisories and displays of the airspace,¹¹² whereas the large fixed costs in developing this custom software is astronomical and impossible for small firms to afford.

“AirMap’s Airspace Advisory API takes in a geometry (i.e. flight area) and a ruleset identifier, returning all the relevant advisories that intersect

Naylor, *Boeing’s Not Alone in Companies that Government Agencies Have Let Self-Regulate*, NPR (Apr. 2, 2019 5:36 PM), <https://www.npr.org/2019/04/02/709203191/boeing-not-alone-in-companies-that-government-agencies-have-let-self-regulate> [https://perma.cc/4CSF-7G2Q].

108. See, e.g., Gary Mortimer, *FlytBase and AirMap Agree to Collaborate on Accelerating UTM Support for Drone Automation*, sUAS NEWS (May 9, 2019), <https://www.suasnews.com/2019/05/flytbase-and-airmap-agree-to-collaborate-on-accelerating-utm-support-for-drone-automation/> [https://perma.cc/F42J-9HWC].

109. *Developers*, AIRMAP, <https://www.airmap.com/developers> [https://perma.cc/TH4E-X8RL]; *Discover, Connect, and Now Fly Your DJI Drone with AirMap*, AIRMAP, (Apr. 3, 2018), <https://www.airmap.com/airmap-for-drones-app-fly-dji/> [https://perma.cc/AY6X-5K4U].

110. *Overview*, AIRMAP, <https://developers.airmap.com/docs/maps-overview> [https://perma.cc/MR7J-VR8K].

111. *Id.*

112. *Developers*, *supra* note 109.

with that flight area.”¹¹³ Regulatory issues with certain airspaces such as the type of aircraft allowed in a specific zone, height restrictions, etc., can be monitored, facilitating a safer and regulatory compliant flight path.¹¹⁴ Without AirMap, mapping a safe and compliant flight path could be prohibitively expensive.¹¹⁵ Hiring someone who knows the rules and regulations for aircraft and differentiating between different flight zones would be expensive—the software clearly offsets that cost and makes frequent UAV flights possible for a wider range of operators.¹¹⁶

AirMap provides additional tools that UAV operators would otherwise have to develop and implement themselves, at a high initial fixed cost. For example, AirMap connects with DroneLogbook to provide a simple and convenient tool for professional and private drone pilots around the world to log and save drone activities data such as flights, drones used, and places traveled, in addition to equipment and maintenance data.¹¹⁷

AirMap’s Traffic Alert API allows developers to provide their pilots with alerts about nearby traffic—including commercial airplanes, general aviation airplanes, helicopters, and some unmanned aircraft. The traffic feed is a combination of several highly reliable sources used by the airline industry. The Traffic Alert API automatically filters to alert the operator of only traffic that is low-altitude and near the current flight path.¹¹⁸

The AirMap UTM Dashboard makes it easy for airspace managers to provide drone operators with safe and secure access to the airspace in three additional ways: (1) identification—knowing who is flying within managed airspace, with contact details and identity verification capabilities; (2) geofencing—creating digital boundaries with rules-based access requirements, instantly publishing geofences to thousands of drone operators; and (3) communication—talking directly with drone operators via individual SMS text messages or broadcast notifications to AirMap-powered applications.¹¹⁹ All these products help small operations compete and even collaborate with large ones. AirMap’s products make it easy and relatively inexpensive to comply with regulations, even in this fast-changing industry.

113. *Airspace Advisory*, AIRMAP, <https://developers.airmap.com/docs/airspace-advisory> [<https://perma.cc/N2TF-S32R>].

114. *See, e.g., id.*

115. *See AirMap Platform*, AIRMAP, <https://www.airmap.com/platform/#industry-participation> [<https://perma.cc/C36A-UUST>].

116. *See id.*

117. *Solution Providers*, AIRMAP, <https://www.airmap.com/solution-providers> [<https://perma.cc/6X4G-USJR>]; *Features*, DRONELOGBOOK, <https://www.dronelogbook.com/hp/1/features.html> [<https://perma.cc/UZ44-2M79>].

118. *Traffic Alerts Overview*, AIRMAP, <https://developers.airmap.com/docs/traffic-alerts-overview> [<https://perma.cc/X97D-J24M>].

119. *See Authorities*, AIRMAP, <https://www.airmap.com/authorities/> [<https://perma.cc/458B-EQSU>].

AirMap is thereby involved in RD. The costs involved in adhering to FAA regulations are high. Pilots and firms involved in flying need to hire employees who know the regulations, monitor those regulations as they change, and then still train those employees to properly use flight planning and airspace software. The technological cost in conjunction with employment costs are high; AirMap mitigates some of those costs by bringing it all together.¹²⁰

C. Avalara

Avalara is a startup that offers a number of regulatory democratization solutions for startups and small businesses, all of whom need to file taxes.¹²¹ Unlike TurboTax and H&R Block, which help natural persons file their individual tax returns, Avalara focuses on tax returns for businesses.¹²² The startup thereby helps its customers comply with Internal Revenue Service (IRS) tax regulations.

120. AirMap specifically shows how RD helps young companies compete with old ones. Over time, regulated companies develop relationships with their regulators. These regulator-regulated relationships give regulated companies more access to the regulator's rulemaking process, help the regulated understand regulatory rules, and provide a way for the regulated to exert influence when the regulator is determining the meaning of regulatory standards. See Norm Champ, *Building Effective Relationships with Regulators*, HARV. L. SCH. F. ON CORP. GOVERNANCE (Oct. 22, 2015), <https://corpgov.law.harvard.edu/2015/10/22/building-effective-relationships-with-regulators> [<https://perma.cc/4JTK-8GKS>]. AirMap levels that playing field. UAV operators have to comply with a complex web of regulations promulgated by the FAA. See, e.g., *Fact Sheet – Small Unmanned Aircraft Regulations (Part 107)*, FED. AVIATION ADMIN. (July 23, 2018), https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=22615 [<https://perma.cc/89KP-KP36>]. These FAA UAV regulations change frequently. See, e.g., *FAA Highlights Changes for Recreational Drones*, FED. AVIATION ADMIN. (May 16, 2019, 12:04 PM), <https://www.faa.gov/news/updates/?newsId=93769> [<https://perma.cc/H4MG-5C3D>]. Although large corporations, such as Boeing, have influenced FAA rulemaking historically, today small startups like AirMap are encouraging “collaborate acceleration.” Through collaborate acceleration, startup aviation companies can engage collectively in lobbying the FAA and encouraging the agency to take a more innovative approach. See *AirMap Supporting NASA and FAA UTM Research Projects*, AIRMAP (Apr. 29, 2019), <https://www.airmap.com/airmap-supporting-nasa-utm-faa-ipp-maap-research-projects> [<https://perma.cc/Y75Q-X43X>]. This facilitates the development of rules that permit young startup companies to innovate in the UAV market.

121. See *We Live and Breathe Tax Compliance So You Don't Have To*, AVALARA, <https://www.avalara.com/us/en/about/trust.html> [<https://perma.cc/YWS4-FA6S>].

122. See *Avalara Products*, AVALARA, <https://www.avalara.com/us/en/products.html> [<https://perma.cc/3G95-KMDU>].

The Avalara AvaTax product uses algorithmic devices to help e-commerce startups and small businesses determine the taxes they owe, especially regarding commerce across state lines.¹²³

The Avalara Returns product allows businesses to “prepare[] and file [their] sales and use tax returns with a higher degree of accuracy than doing it” on their own.¹²⁴ In other words, the product is designed to reduce error costs and penalties for failure to comply with regulations. Moreover, Avalara expressly acknowledges that their product meets the criteria for a regulatory democratization solution: “Avalara pricing is volume-based and designed to scale with your business.”¹²⁵ This qualifies Avalara as a firm offering an RD solution.

D. Cognigo

Cognigo, founded in 2016¹²⁶ and acquired by NetApp in 2019,¹²⁷ was another business that described itself as a startup offering a RD solution. Cognigo used artificial intelligence (AI) and machine learning to help businesses protect their data and stay in compliance with regulations involving data privacy,¹²⁸ such as the General Data Protection Regulation

123. See *The Power of Orange*, AVALARA, <https://www.avalara.com/us/en/about.html> [<https://perma.cc/7CP5-8SYF>].

124. *Returns Preparation and Filing*, AVALARA, <https://www.avalara.com/us/en/products/sales-and-use-tax/returns.html> [<https://perma.cc/PYE4-HXFK>].

125. *AvaTax Pricing*, AVALARA, <https://www.avalara.com/us/en/products/sales-and-use-tax/avatax/avatax-pricing.html> [<https://perma.cc/YLB4-7XNR>].

126. See *Cognigo*, MEDICI GLOBAL, INC., <https://gomedici.com/companies/cognigo> [<https://perma.cc/XHV4-BHT7>].

127. Joseph F. Kovar, *NetApp Acquires Israeli Data Security Developer Cognigo*, CRN (May 30, 2019), <https://www.crn.com/news/storage/netapp-acquires-israeli-data-security-developer-cognigo> [<https://perma.cc/T8T9-KAXX>]. Note that Section III.F refers to Cognigo’s practices in the past tense because of its acquisition by NetApp, see *id.*, although some of the articles cited in this Section were published prior to the acquisition, see *infra* note 128.

128. Frederic Lardinois, *Cognigo Raises \$8.5M for its AI-Driven Data Protection Platform*, TECHCRUNCH (Nov. 13, 2018), <https://techcrunch.com/2018/11/13/cognigo-raises-8-5m-for-its-ai-driven-data-protection-platform/> [<https://perma.cc/JA9B-ZJSS>]; see also Derrick L. Maulsby, Jr. & Jason L. Ott, *The Future of Data Privacy: Corporate Compliance in a Post-GDPR Global Market*, CPO MAGAZINE (Nov. 15, 2018), <https://www.cpomagazine.com/data-protection/the-future-of-data-privacy-corporate-compliance-in-a-post-gdpr-global-market> [<https://perma.cc/XB3Z-T38U>] (“That lack of legal authority concerning ownership of personal information has changed significantly with the recent enactment of the General Data Protection Regulation (the ‘GDPR’) in the European Union (the ‘EU’). In a broad sense, the GDPR has given EU residents power over their personal information. The GDPR bill, which was passed in 2016 and took effect in May of 2018, grants EU residents substantial rights with regard to their personal information[]” including “the right to be forgotten[,] the right to access” the information and “the right to data portability.”).

(GDPR).¹²⁹ Cognigo

promise[d] that it c[ould] help businesses protect their critical data assets and prevent personally identifiable information from leaking outside of the company’s network. And it sa[id] it c[ould] do so without the kind of hands-on management that’s often required in setting up these kinds of systems and managing them over time.¹³⁰

After the initial setup, Cognigo’s solution was entirely “human-free.”¹³¹ That means Cognigo had the capability of scaling massively. The company achieved data security and compliance with GDPR in a fraction of the time: cognitive computing allows a startup to become compliant in days as opposed to months.¹³² Cognigo managed and secured critical data assets through their DataSense program by using advanced machine learning algorithms.¹³³ The DataSense program was “trained to detect common categories like paystips, patents, NDAs [non-disclosure agreements], and contracts. Organizations c[ould] also provide their own data samples to further train the model and customize it for their own needs.”¹³⁴

The specifics regarding Cognigo’s AI technology and examples of its use in the real world will require further study. Although founded recently in 2016, the company was already acquired by NetApp in an effort to “provide NetApp’s Cloud Volume Ontap with AI-driven compliance.”¹³⁵ That will be increasingly important given that over 80 percent of organizations will fail to implement a comprehensive data governance scheme by 2021¹³⁶ It is clear that Cognigo was involved in RD. Moreover, Cognigo showed how AI technology can enable more RD solutions.

129. Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data and Repealing Directive 95/46/EC, 2016 O.J. (L119/1) [hereinafter “GDPR”].

130. See Lardinois, *supra* note 128.

131. *Id.*

132. See *Cognigo*, CRUNCHBASE, <https://www.crunchbase.com/organization/cognigo> [<https://perma.cc/RZ4A-3TLC>].

133. See Kovar, *supra* note 127.

134. Lardinois, *supra* note 128.

135. Kovar, *supra* note 127.

136. *Id.*

E. Metomic

Metomic is a new startup that was founded in June of 2018¹³⁷ to help startups and small businesses comply with a new regulation, the GDPR,¹³⁸ which was implemented on May 25, 2018.¹³⁹ In fact, Metomic was founded to be a GDPR solution for the multitude of small firms that could not otherwise afford to comply with the new regulation.¹⁴⁰

There are a number of firms offering GDPR solutions, but most offer these solutions in the form of a traditional consulting arrangement, where a consultant offers customized compliance advice.¹⁴¹ Much like the high fixed cost of implementing customized HIPAA compliant email services in a medical office,¹⁴² implementing customized GDPR compliant solutions requires firms to expend significant resources up-front.

Metomic is different in that it offers tools that firms can use on a variable basis. Its application program interfaces (APIs) can be licensed on a per-domain or per-user basis.¹⁴³ For small firms who have low site usage, Metomic is totally free.¹⁴⁴ As the business grows, Metomic offers various packages that range up to \$250 per month per domain.¹⁴⁵

The scalable, variable cost nature of Metomic's GDPR solution distinguishes it from traditional privacy consulting services, which have high up-front fixed costs. As such, Metomic is an RD firm, whose business model is to help startups and small businesses of all sizes—especially the smallest ones—and to provide web solutions that comply with GDPR.

137. See *Metomic*, CRUNCHBASE, <https://www.crunchbase.com/organization/metomic#section-overview> [<https://perma.cc/V9WC-V2CZ>].

138. METOMIC, <https://metomic.io> [<https://perma.cc/XZ8B-JAKH>].

139. See Linda Hsu & Jena Valdetero, *Data Breach Litigation Preparation: How Do European Union Breach Notification Requirements Differ from the U.S.?*, JD SUPRA (Feb. 6, 2020), <https://www.jdsupra.com/legalnews/data-breach-litigation-preparation-how-31454> [<https://perma.cc/5BWC-789F>].

140. See METOMIC, *supra* note 138.

141. See Amy Cross, *Best GDPR Software Tools and Solutions*, NGDATA (Feb. 1, 2018), <https://www.ngdata.com/gdpr-software-tools-and-solutions> [<https://perma.cc/AZJ7-2VXN>] (listing fifty-one services offering GDPR compliance solutions). For example, IBM Security, Connexica, LogicManager, OneTrust, BWISE, Forcepoint, Proofpoint, and ZenGRC all offer GDPR solutions. *Id.*

142. See *supra* notes 80–83, 92–96 and accompanying text.

143. See *Metomic*, GOLDEN, <https://golden.com/wiki/Metomic> [<https://perma.cc/QHS5-LVBX>]; Jonathan Freeman, *What Is an API? Application Programming Interfaces Explained*, INFOWORLD (Aug. 8, 2019, 3:00 AM), <https://www.infoworld.com/article/3269878/what-is-an-api-application-programming-interfaces-explained.html> [<https://perma.cc/PBE7-V92M>].

144. *Metomic*, *supra* note 143.

145. See *Choose the Plan That's Right for You*, METOMIC, <https://metomic.madetogether.co/pricing> [<https://perma.cc/6NLL-56ZB>].

F. Amazon Web Services (AWS)

While Amazon Web Services (AWS) is not a startup—Amazon is one of the largest companies in the world¹⁴⁶—many entrepreneurs use AWS for compliance.¹⁴⁷ From the interviews conducted in The Startup Survey, researchers learned that AWS prominently factors into how startups are able to compete with incumbents. AWS is a paradigm of RD, and it makes a huge impact on the ability of startups to enter regulated markets.

AWS launched in 2006 to provide pay-as-you-go access to computing power.¹⁴⁸ Prior to AWS, data processing generally required the construction of expensive server farms,¹⁴⁹ a project that only large and well-funded firms could undertake.¹⁵⁰ AWS offered “data democratization” and provided a scalable infrastructure that startups and small businesses could use.¹⁵¹

Moreover, AWS is certified as compliant in over fifty programs worldwide.¹⁵² In particular, AWS is compliant with GDPR.¹⁵³ AWS users do not need to take any additional action to get the benefit of AWS’s GDPR compliance. This represents a huge savings of fixed regulatory information and compliance costs to startups.¹⁵⁴

146. See Alexis C. Madrigal, *When Amazon Went from Big to Unbelievably Big*, ATLANTIC (Feb. 7, 2019), <https://www.theatlantic.com/technology/archive/2019/02/when-amazon-went-from-big-to-unbelievably-big> [<https://perma.cc/B69X-D2GT>].

147. See *About AWS*, AMAZON, <https://aws.amazon.com/about-aws> [<https://perma.cc/C7VV-YXLQ>].

148. See *id.*

149. See *Six Advantages of Cloud Computing*, AMAZON, <https://docs.aws.amazon.com/whitepapers/latest/aws-overview/six-advantages-of-cloud-computing.html> [<https://perma.cc/N98K-UA7W>] (“Cloud computing lets you focus on your own customers, rather than on the heavy lifting of racking, stacking, and powering servers.”).

150. See Ke-Wei Huang & Mengqi Wang, *Firm-Level Productivity Analysis for Software as a Service Companies*, 2009 PROC. INT’L CONF. ON INFO. SYSTEMS 1, 5, <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1184&context=icis2009> [<https://perma.cc/768W-CT8N>] (“In an industry with economies of scale, firms will enjoy lower average costs when the firm size is larger, rewarding larger firms and leading to a monopoly or oligopoly in the end.”).

151. *AWS Partner Story: Edmunds*, AMAZON, <https://aws.amazon.com/partners/success/edmunds-tableau> [<https://perma.cc/8RPN-X7PQ>].

152. See *AWS Compliance Programs*, AMAZON, <https://aws.amazon.com/compliance/programs> [<https://perma.cc/J4TZ-UQDJ>].

153. *General Data Protection Regulation (GDPR) Center*, AMAZON, <https://aws.amazon.com/compliance/gdpr-center> [<https://perma.cc/HH75-H8ZW>].

154. Cf. Oliver Smith, *The GDPR Racket: Who’s Making Money From This \$9bn Business Shakedown?*, FORBES (May 2, 2018, 2:30 AM), <https://www.forbes.com/sites/oliversmith/2018/05/02/the-gdpr-racket-whos-making-money-from-this-9bn-business->

AWS provides many services, but their central product is Amazon Elastic Compute Cloud (EC2).¹⁵⁵ As the name implies, EC2 makes data processing more flexible by allowing users to rent virtual computers on which to run their own computer applications. Users pay by the second to use servers that AWS owns.¹⁵⁶

This proved to be a win-win for Amazon and for the marketplace; over 150,000 developers,¹⁵⁷ 17,500 nonprofits,¹⁵⁸ 2,400 educational institutions,¹⁵⁹ and 5,000 government agencies¹⁶⁰ have used AWS, while AWS generated over \$25.6 billion in sales in 2018.¹⁶¹

In economic terms, AWS changed the cost curve for data processing in a way that especially benefitted startups and small businesses. Prior to AWS, data processing required a huge upfront investment, or a “fixed cost,” in that the expense of the server farm must be incurred before any production or sales of data occurred.¹⁶² Pre-sales startups may not have income to pay for these initial fixed costs, whereas incumbent firms with multiple revenue streams can cover this investment relatively easily. Additionally, some of these upfront costs are “sunk” in that they can never be recovered

shakedown/#70e8a78234a2 [https://perma.cc/882T-PZYB]. Forbes reported that the world’s Fortune 500 companies spend a total of \$7.8 billion on GDPR compliance, an average of \$16 million per firm. *See id.* Startups would likely spend less per firm, but this still paints a picture of the huge compliance cost for GDPR.

155. *See Amazon EC2*, AMAZON, <https://aws.amazon.com/ec2/> [https://perma.cc/YCE6-PTX8].

156. *See Amazon EC2 Pricing*, AMAZON, <https://aws.amazon.com/ec2/pricing/> [https://perma.cc/T7TB-MMFJ] (“With On-Demand instances, you pay for compute capacity by the hour or the second depending on which instances you run. . . . With per-second billing, you pay for only what you use.”).

157. *See Savia Lobo, Why AWS Is the Preferred Cloud Platform for Developers Working with Big Data*, PACKT (June 7, 2018), <https://hub.packtpub.com/why-aws-is-the-preferred-cloud-platform-for-developers-working-with-big-data> [https://perma.cc/G7EV-67GD].

158. *See Announcing AWS Cloud Credits for Nonprofits with TechSoup Global*, AMAZON (Mar. 4, 2016), <https://aws.amazon.com/blogs/publicsector/announcing-aws-cloud-credits-for-nonprofits-with-techsoup-global/> [https://perma.cc/9GA5-L46Y].

159. *See AWS Educate*, AMAZON, <https://aws.amazon.com/education/awseducate/> [https://perma.cc/X5LS-FX8R].

160. *See The Trusted Cloud for Government*, AMAZON, <https://aws.amazon.com/government-education/government/> [https://perma.cc/A3S2-5QVM].

161. Alison Griswold, *Amazon Web Services Brought in More Money than McDonald’s in 2018*, QUARTZ (Feb. 1, 2018), <https://qz.com/1539546/amazon-web-services-brought-in-more-money-than-mcdonalds-in-2018> [https://perma.cc/S3D2-ADEC]; *How Much is Amazon Web Services Worth on a Standalone Basis*, FORBES (Feb. 28, 2019, 3:45 PM), <https://www.forbes.com/sites/greatspeculations/2019/02/28/how-much-is-amazon-web-services-worth-on-a-standalone-basis/#41b7bef8bbb7> [https://perma.cc/E4D9-DL2M].

162. *See STEVEN A. GREENLAW & DAVID SHAPIRO, PRINCIPLES OF MICROECONOMICS* 167 (2d ed. 2018) (“At zero production, the fixed costs . . . are still present.”).

if the project fails.¹⁶³ Startups and small businesses cannot manage the risk of losing sunk costs to the degree that incumbents can.¹⁶⁴

AWS thus exhibits a strong form of RD that can have a major impact on startup entry and post-entry growth and innovation in markets regulated by GDPR and other privacy laws. Incumbents may prefer industrial organizations that demand large sunk costs so they can fend off startups.¹⁶⁵ AWS helps startups compete against incumbents by transforming sunk costs into variable costs.¹⁶⁶ AWS converted the up-front fixed costs of building a GDPR-compliant server farm into the variable cost of server access, which scales in step with output or sales.¹⁶⁷ This data democratization helps startups process data and comply with privacy regulations at a per unit cost similar to their incumbent competitors. Thanks to AWS's RD solution, startups can pay as they grow, instead of making big investments upfront. Otherwise, the large fixed costs of creating data servers that are compliant with the new, complex, and dynamic web of privacy regulations would benefit high-volume incumbents over pre-sales startups.

As discussed above, fixed costs, and especially sunk costs, have a disparately negative impact on startups.¹⁶⁸ It is well-documented that converting fixed

163. See JEFFREY M. PERLOFF, MICROECONOMICS 185 (Donna Battista et al. eds., 5th ed. 2009) (“Because the equipment has no alternative use, the historical cost of buying that capital is a sunk cost: an expenditure that cannot be recovered.”).

164. See Robert S. Pindyck, *Sunk Costs and Risk-Based Barriers to Entry* 1 (Nat'l Bureau of Econ. Research, Working Paper No. 14755, 2009), <https://www.nber.org/papers/w14755.pdf> [<https://perma.cc/X5PV-FYCN>] (“Thus large sunk costs are clearly an entry barrier; by creating scale economies, they lead to an industry equilibrium with relatively few firms.”).

165. See Richard Schmalensee, *Sunk Costs and Antitrust Barriers to Entry* 2 (Mass. Inst. of Tech. Sloan Sch. of Mgmt., Working Paper No. 4457-04, 2004), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=486944 [<https://perma.cc/KN4W-J4HG>] (“But unless entry involves sunk costs—which cannot be recovered or, if amortized and treated as a flow, cannot be avoided if exit occurs—contestability theory teaches that scale economies do not suffice to permit established firms to hold price above cost without attracting (hit-and-run) entry.”); see also JOE S. BAIN, INDUSTRIAL ORGANIZATION 252 (2d ed. 1968) (“[T]he condition[s] of entry [are] the extent to which, in the long run, established firms can elevate their selling prices above the minimal average costs of production and distribution . . . without inducing potential entrants to enter the industry.”).

166. For a discussion of the advantages of variable costs, see Schmalensee, *supra* note 165, at 5–6.

167. See PERLOFF, *supra* note 163, at 186 (“A firm’s variable cost (VC) is the production expense that changes with the quantity of output produced.”).

168. See Pindyck, *supra* note 164, at 1.

costs into variable costs can enhance competition.¹⁶⁹ By definition, fixed costs are a type of entry barrier, as they are costs that must be borne by a startup trying to enter the market, but not by an incumbent who is already in the market.¹⁷⁰ In antitrust law, it is axiomatic that markets with lower fixed costs are more competitive.¹⁷¹ Moreover, this competition results in lower prices and higher quality products.¹⁷² Indeed, one reason why many startups attempted to enter the software industry in the dot.com era is that software engineering firms were able to shift most of their costs to variable costs.¹⁷³

Therefore, AWS provides a vital service to startups by enabling the conversion of fixed and sunk costs of regulatory compliance to variable costs, which also equalizes the incidence of these costs on startups vis-à-vis incumbents.

IV. ANALYSIS OF REGULATORY DEMOCRATIZATIONS

What is common about the regulations that RD startups have addressed? Answering this question may provide insights toward designing efficient business regulations. Startups have developed RD compliance solutions for the Health Insurance Portability and Accountability Act (HIPAA), Federal Aviation Administration (FAA) airspace regulations of unmanned aerial vehicles (UAV), the Internal Revenue Service (IRS) tax code, and the General Data Protection Regulation (GDPR). What is common about these regulations? Section A will answer that question. Section B will

169. See, e.g., Yunchuan Liu & Rajeev K. Tyagi, *Outsourcing to Convert Fixed Costs into Variable Costs: A Competitive Analysis*, 34 INT'L J. RES. MARKETING 252, 252 (2017) (“[Outsourcing] allows the outsourcing firm to reduce its fixed cost[s] such as expenditures on equipment, information technology, fixed salaries of employees, etc., and convert those into a variable cost in the form of the purchase price that the outsourcing firm then pays the outside industry.”).

170. See William J. Baumol & Robert D. Willig, *Fixed Costs, Sunk Costs, Entry Barriers, and Sustainability of Monopoly*, 96 Q.J. ECON. 405, 416 (1981) (“[F]ixed costs of sufficient magnitude can effectively prevent entry, which suggests that they might be classed as a type of entry barrier”).

171. See Nirmalya Kumar, *Strategies to Fight Low-Cost Rivals*, HARV. BUS. REV. (Dec. 2006), <https://hbr.org/2006/12/strategies-to-fight-low-cost-rivals> [<https://perma.cc/3AT8-EK8X>].

172. See BUREAU OF COMPETITION, FED. TRADE COMM’N, *COMPETITION COUNTS: HOW CONSUMERS WIN WHEN BUSINESSES COMPETE 2* (2015), https://www.ftc.gov/system/files/attachments/competition-counts/pdf-0116_competition-counts.pdf [<https://perma.cc/4RNG-2RQK>].

173. See J.J. Dolado, *On the Problem of the Software Cost Function*, 43 INFO. & SOFTWARE TECH. 61, 69 (2001) (“In most cases, the marginal return is so low that asserting that economies or diseconomies of scale exist is very questionable.”).

apply that answer to an analysis of when RD is likely to arise and foster competition in regulated industries.

A. *The Nature of Regulation*

HIPAA, FAA UAS, GDPR, and the IRS tax code are all complex, rule-based systems of regulation. These are distinguishable from simple rules and standards. Figure 2 illustrates how complex rules fit into the taxonomy of regulations.

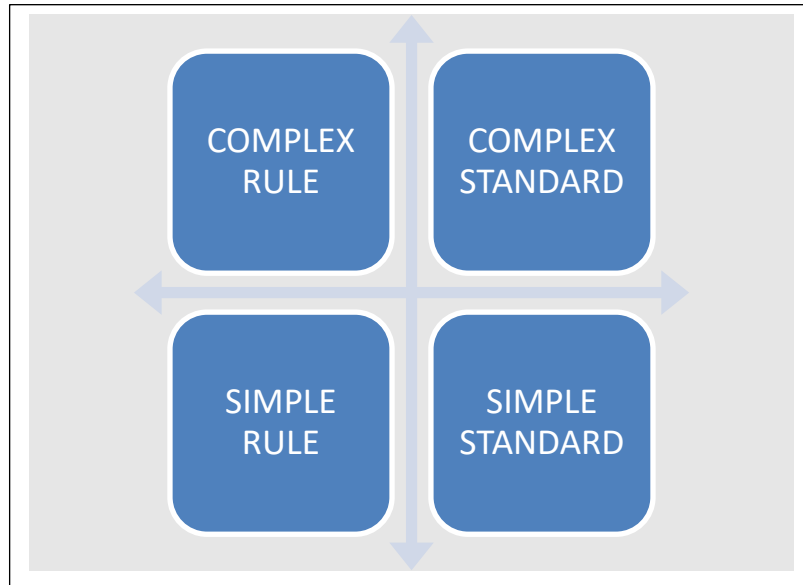


Figure 2. Taxonomy of Regulations.

1. *Rules Versus Standards*

As shown in Figure 3, there are four categories of regulations across two dimensions: simple/rule, complex/rule, simple/standard, and complex/standard.¹⁷⁴ RD seems to arise only in response to complex rules. Unpacking the meaning of this finding requires a brief discussion on rules versus standards.

174. See Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557, 566 (1992).

The economics of rules versus standards usually begins by distinguishing ex ante versus ex post decision-making.¹⁷⁵ Ex ante costs are incurred before an action is taken.¹⁷⁶ Ex post costs are incurred afterward.¹⁷⁷ These concepts map neatly on to a simplified version of rules and standards.¹⁷⁸

Rules are determined ex ante, in advance.¹⁷⁹ For example, “Speed Limit 70 MPH” is a rule.¹⁸⁰ The speed limit is determined in advance. This requires regulators to pay an upfront rulemaking cost,¹⁸¹ such as by surveying roadways, posting signs, updating equipment, and monitoring noncompliance. The regulated must also bear an up-front cost to become informed about the speed limit and monitor for changes.¹⁸² Although rules also have ex post costs including detection and enforcement,¹⁸³ breaches of rules are relatively easy to adjudicate, so more of the costs of rules are incurred up front.

In contrast, standards are determined ex post, after the fact. On highways in Montana, with no posted speed limits, drivers must still be “reasonable.”¹⁸⁴ What does that mean? In this initial state, a standard is an abstraction, and it does not have a concrete meaning. Only after someone is pulled over for driving 120 MPH through rural Montana and is adjudicated to have been driving unreasonably does this standard have a specific context. Over time, however, as cases involving unreasonable speed in Montana are adjudicated, the collective impact of this precedential case law is to have predictive value.¹⁸⁵ If 99 of 100 people who were pulled over for driving 120 MPH were adjudicated to be unreasonable, we can now determine with sufficient confidence ex ante that 120 MPH is unreasonably fast.

Thus, standards have the advantage of generating rule-making costs only as needed.¹⁸⁶ Unlike rules, where every scenario must be accounted for in

175. See DAVID D. FRIEDMAN, *LAW’S ORDER: WHAT ECONOMICS HAS TO DO WITH LAW AND WHY IT MATTERS* 74 (2000). Ex ante decisions are those which are made with the information the actor possesses at the time. *Id.* Some ex ante punishments are designed to mitigate behavior that would increase the probability of an undesirable outcome, such as punishing drunk driving. *Id.* However, ex post laws punish behavior based on the undesirable outcome observed and therefore exploit an actor’s personal, private information by having the actor use his knowledge to conform to the law, such as imposing tort liability for damage done. *Id.* at 74–75.

176. See *id.*

177. See *id.*

178. See Kaplow, *supra* note 174, at 559–60.

179. See *id.* at 589.

180. See *id.* at 565.

181. See *id.* at 568–69.

182. See *id.* at 569.

183. See *id.* at 570.

184. MONT. CODE ANN. § 61-8-303(3) (2019).

185. See Kaplow, *supra* note 174, at 577–79.

186. See *id.* at 610 & n.148.

advance, a standard is only defined when its boundaries are tested. Moreover, it gains definition from the real world, and thus is most likely to comport with reasonable expectations.

2. *Simplicity Versus Complexity*

Whether a rule or a standard, a regulation can also be simple or complex.¹⁸⁷ The complexity of a regulation is related to the number or amount of facts that must be considered in order to apply the rule.¹⁸⁸ In the case of rules, complexity is relatively easy to illustrate. For example, “Car Parking \$1 Per Hour” is a simple rule in that it only requires one fact, namely, how long the car was parked. Parking rules can be more complex of course, such as: “Car Parking \$1 Per Hour, no parking 8:30 am – 9:30 am on weekdays, free parking 6 pm – 6 am and on Sundays.”

Complex rules generally cost more to develop than simple rules. Complexity with regards to standards is a bit harder to quantify—which is unsurprising given the inherently qualitative nature of standards—but here again an illustration helps demonstrate the distinction. One of the simplest standards may be the constitutional ban on cruel and unusual punishments:¹⁸⁹ “It does not take most people very long to decide whether a punishment is cruel.”¹⁹⁰

A more complex standard may be found in the doctrine of promissory estoppel. This doctrine, which is also known as detrimental reliance, was established in the late nineteenth century by judges who felt compelled to enforce promises that did not rise to the level of contracts at law.¹⁹¹ A common articulation of this standard is as follows: “A promise which the promisor should reasonably expect to induce action or forbearance on the part of the promisee or a third person and which does induce such action or forbearance is binding if injustice can be avoided only by enforcement of the promise.”¹⁹² This is a complex standard because reasonable people often disagree when “injustice can be avoided only by enforcement of the

187. See *id.* at 566.

188. See, e.g., *id.* at 565.

189. See U.S. CONST. amend. VIII.

190. John Harrison, *Richard Epstein's Big Picture*, 63 U. CHI. L. REV. 837, 862 (1996).

191. See Kevin M. Teeven, *Origins of Promissory Estoppel: Justifiable Reliance and Commercial Uncertainty Before Williston's Restatement*, 34 U. MEM. L. REV. 499, 500 (2004); Eric Mills Holmes, *Restatement of Promissory Estoppel*, 32 WILLAMETTE L. REV. 263, 275–76, 275 n.23 (1996).

192. RESTATEMENT (SECOND) OF CONTRACTS § 90(1) (AM. LAW INST. 1981).

promise.”¹⁹³ Making such a determination usually requires a great deal of fact-finding and a full-blown bench trial.¹⁹⁴ This makes complex standards quite expensive to administer in comparison to simple standards.

3. *Evolution of Standards into Rules*

However, the discussion above about simplicity versus complexity was oversimplified in that it did not take into account the impact of precedent over time. Any cost-benefit analysis of rules versus standards is incomplete if it assumes that laws are static, and that each case is a matter of first impression. This is of course not how our common law legal system works. Rather, over time, precedent, whether binding or simply persuasive, informs the application of regulations.¹⁹⁵

Recall the distinction of two speed limits, a “70 MPH” rule and a “reasonable and prudent speed” standard.¹⁹⁶ In a matter of first impression, a judge would need to conduct extensive fact-finding to determine whether a driver violated the standard-based speed limit. But, over time, as similar cases are decided, this vague standard develops characteristics of a complex rule. For example, if a judge determines that a driver operating a high-end sports car at 120 MPH on a clear day with excellent driving conditions was driving unreasonably, this effectively creates a rule that sets an upper bound to what could be considered a reasonable speed. Later, another judge determines that a driver was imprudent when driving 80 MPH in heavy snow, but another driver was prudent when driving 90 MPH to take his friend to the hospital.

After years of this standard being on the books, something resembling a complex rule evolves. For instance, this hypothetical speed limit standard begins to have rule-like features such as an absolute 120 MPH speed limit in all cases, a lower 80 MPH speed limit in daytime snow, and an exception for emergency services.

B. Rules, Standards, and Regulatory Democratization

The case studies of RD described in Part II share a common thread. Although they address different regulations—HIPAA, FAA UAV regulations, the IRS tax code, and GDPR—they all address the same type of regulation: complex, rule-based regulations. This Section B explains why complex,

193. See *id.*; Charles L. Knapp, *Rescuing Reliance: The Perils of Promissory Estoppel*, 49 HASTINGS L. J. 1191, 1218–19 (1998).

194. See generally Knapp, *supra* note 193 (providing an overview of the Second Restatement and analyzing multiple promissory estoppel claims that went to trial).

195. See Kaplow, *supra* note 174, at 577–79.

196. See *supra* notes 176–84 and accompanying text.

rule-based regulations are most likely to encourage the development of RD technology.

In short, computer programs are good at processing rules but incompetent at exercising discretionary standards. Now that computer technology has scaled to provide regulatory compliance for large numbers of small firms, it is worth revisiting the economics behind the rules versus standards debate to see whether technological change in information and enforcement costs have impacted the cost-benefit analysis.

1. Simple Rules and RD

The Startup Study did not find evidence of large-scale RD in response to simple rules. However, that does not mean that simple rules are inferior to complex ones. Rather, it tends to show that simple rules may promote efficient compliance even without technological solutions. For example, numeric speed limits are simple rules that have been reasonably efficient despite a lack of technological advancement.¹⁹⁷ The non-existence of RD in response to simple rules may simply show these rules tend to be efficient without further intervention.

Moreover, when rules are relatively simple, regulators often create their own compliance technologies.¹⁹⁸ Although this phenomenon is itself a subject for another paper, this Article has alluded to the emergence of regulatory technology that lowers information and enforcement costs.

While complex regulations may foster RD, they may inhibit other desirable business activities. Complexity is not a good unto itself. As stated earlier, holding everything else constant, a simpler regulation will have less of a disparate impact on startups than a complex regulation.¹⁹⁹ Complex regulations generally have higher information costs, and startups are less able to distribute those information costs than incumbents.²⁰⁰ By lowering information costs, the startups' disadvantage is likewise decreased.²⁰¹

197. See generally Tom Sohrweide, *The Truth About Speed Limits, Explained by an Engineer*, SHORT ELLIOTT HENDRICKSON INC., <http://www.sehinc.com/news/truth-about-speed-limits-explained-engineer> [<https://perma.cc/3EA4-DN63>] (explaining that speed limits do not dictate speeds but rather reflect the way drivers behave on the road).

198. See Richard Williams & Mark Adams, *Regulatory Overload*, 103 MERCATUS ON POL'Y 1, 3 (2012), https://www.mercatus.org/system/files/Regulatory_Overload_Williams_Adams_MOP103.pdf [<https://perma.cc/H8T7-GLRF>].

199. See *supra* notes 21–24, 168 and accompanying text.

200. See *supra* notes 75–77 and accompanying text.

201. See *supra* notes 75–77 and accompanying text.

However, not all regulations can easily be made simple. Life is complex.²⁰² There are two approaches to regulating a complex situation: granting a great deal of discretion to the regulator to figure out the application of a rule in each specific scenario or drafting complex regulations that account for many different scenarios in advance.²⁰³ The latter is the lesser of two evils, at least insofar as RD is concerned, as the more complex but inherently knowable regulation can be resolved to some level of certainty through the process of RD.

2. RD's Incompatibility with Standards

Problematically for RD, “reasonable” standards cannot usually be determined algorithmically in advance by technology. What speed should a self-driving car operate on a new vacant highway in central Montana? How should the car know what is a “reasonable” speed? And who should be liable if that speed turns out after the fact to be unreasonable?

It is the providence of lawyers and consultants to opine on the best response to uncertainty, whereas computers cannot replace human judgment.²⁰⁴ Standards, in other words, present a computational problem.

Regulatory discretion—that is, the degree to which regulators can make decisions on a case-by-case basis—inhibits RD. The introduction of human discretion into the equation makes it very difficult or impossible to have generic solutions to regulatory problems. Technology is still no match for the whim of the bureaucrat. Even AI technology has difficulty in predicting human behavior.²⁰⁵

Discretion is often cloaked in vagueness. Vague terms are hard to understand and impossible to code, which drives up the cost of inexperience while simultaneously prohibiting RD. Discretion is likewise problematic because incumbents generally have longer relationships and more significant working histories with regulators. Incumbents may also have more political influence, possibly due to their role in creating local jobs or donating to political campaigns.²⁰⁶

202. *But see* OSCAR WILDE, EPIGRAMS OF OSCAR WILDE 66 (2007) (“Life is not complex. We are complex. Life is simple and the simple thing is the right thing.”).

203. *See* Williams & Adams, *supra* note 198, at 1, 3.

204. *See infra* notes 205–09 and accompanying text.

205. *See, e.g.*, Jim Mainprice, Rafi Hayne & Dmitry Berenson, *Goal Set Inverse Optimal Control and Iterative Re-planning for Predicting Human Reaching Motions in Shared Workspaces*, 32 INST. ELECTRICAL & ELECTRONICS ENGINEERS TRANSACTIONS ON ROBOTICS 897, 897 (2016). *But see, e.g.*, Alex Pentland & Andrew Liu, *Modeling and Prediction of Human Behavior*, 11 NEURAL COMPUTATION 229, 229 (1999) (demonstrating that a model of human behavior can improve human-machine systems).

206. *See* Jonathan A. Knee, *Review: Why Start-Ups Need a Regulatory Strategy to Succeed*, N.Y. TIMES (Sept. 11, 2018), <https://www.nytimes.com/2018/09/11/business/dealbook/>

Moreover, creating a scalable solution for a discretionary regulation would be a difficult task for an enterprising RD startup. Discretionary regulations include language such as “reasonable” and thereby require a judge or some arbiter to determine what reasonable means in a certain case.²⁰⁷ Such regulations do not have general rules that can be easily extrapolated and applied in many different contexts, and so, these discretionary rule problems would be harder to solve for a wider range of firms who operate in more disparate fields than a single large firm.

Rules, however, are within the domain of the computational sciences. Modern computers can make short work even of very complex rules. When regulations are rule-based, RD technology can solve them with lower information and error costs.

Simple rules may be better at producing compliance and low cost, but some rules cannot be so simplified.²⁰⁸ Simple standards are more feasible to implement, but their discretionary nature is suboptimal for an algorithmic approach. Moreover, their ambiguity may encourage a different process: regulatory entrepreneurship.²⁰⁹ The Startup Study revealed that complex regulatory standards often result in rational entrepreneurs’ willful ignorance and noncompliance. See Figure 3 for an illustration of regulatory predictors of RD emergence.

fixer-regulatory-hacking-review.html [https://perma.cc/F5YP-GBBA]; *see also* Eyal-Cohen, *supra* note 10, at 863–64 (“Whereas old-timers may be able to spread regulatory costs over their output or longevity, newcomers are more likely limited in their ability to mitigate these costs due to structural obstacles. . . . The effects of regulatory asymmetries on newcomers are palpable.”).

207. *See supra* Section IV.A.3.

208. *See, e.g.*, Kaplow, *supra* note 174, at 589–90.

209. *See* Pollman & Barry, *supra* note 17, at 383, 385.

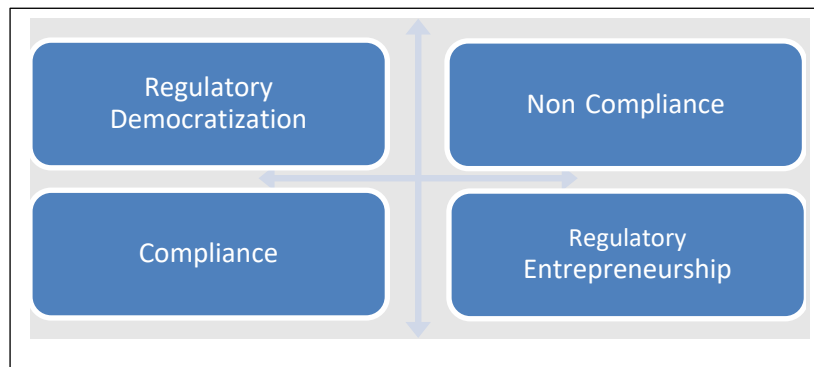


Figure 3. Predictors of regulatory democratization.

3. Complex Rules and RD

In contrast with regulatory discretion, which is likely to inhibit RD, regulatory complexity—the number of words, lines, provisions, etc. in a rule—does not appear to hinder RD. In fact, there are theoretical reasons to believe that regulatory complexity promotes RD.²¹⁰ The Startup Study’s qualitative findings also support this.²¹¹

The Startup Study shows evidence of RD in the face of complex regulations. Consider the three regulations addressed by the startups in our case study: GDPR, HIPAA, and FAA UAS. They are all highly complex regulations. Just the official title of the General Data Protection Regulation (GDPR)²¹² contains more words and characters than portions of the Sherman Act that make conspiracy illegal.²¹³ The GDPR spans eighty-eight pages and is translated into twenty-four languages.²¹⁴ A common refrain in the legal news is that “GDPR compliance can be complex.”²¹⁵

HIPAA is also very complex. The U.S. Department of Health & Human Services (HHS) *Summary* of the HIPAA Privacy Rule is eighteen pages long, not including endnotes.²¹⁶ The rule itself is so complex that HHS

210. See *supra* Section IV.B.1.

211. See *supra* Part II.

212. See GDPR, *supra* note 129.

213. Compare *id.*, with Sherman Act, 15 U.S.C. § 1 (2018).

214. See GDPR, *supra* note 129; Jeroen Terstegge, *GDPR: Lost in Translation?*, INT’L ASS’N PRIVACY PROFESSIONALS (May 1, 2018), <https://iapp.org/news/a/gdpr-lost-in-translation> [<https://perma.cc/MP86-BKY8>].

215. *Top Five Concerns with GDPR Compliance*, THOMSON REUTERS, <https://legal.thomsonreuters.com/en/insights/articles/top-five-concerns-gdpr-compliance> [<https://perma.cc/3NJ8-E4LM>].

216. See U.S. DEP’T OF HEALTH AND HUM. SERVS., *SUMMARY OF THE HIPAA PRIVACY RULE* (2003), <https://www.hhs.gov/sites/default/files/privacysummary.pdf> [<https://perma.cc/J5QJ-3WPU>].

promulgated a HIPAA Administrative Simplification.²¹⁷ However, that simplification is itself so complex that it is scattered in three different places throughout the Code of Federal Regulations.²¹⁸ The combined text is 105 pages.²¹⁹

Regulation of drones is even more complex because it involves a network of federal, state, and local regulations on unmanned aircraft.²²⁰ While the federal government has “exclusive sovereignty of airspace” over the United States,²²¹ there are actually six classes of airspace, depending on the space’s height above sea level, height above ground level, and other factors, plus special use airspace, and other airspace areas.²²² These classifications are not static but may vary on a day-to-day or even hour-by-hour basis.²²³ Moreover, their use may be coordinated by a controller and conditioned on weather and other external factors.²²⁴ In addition to this complex regulation of public airspace, drone operators must also consider private airspace.²²⁵ In short, we see regulatory democratization in highly complex regulatory environments.

This qualitative evidence supports the hypothesis that entrepreneurs may see a greater market opportunity in tailoring their service to complex

217. See *The HIPAA Privacy Rule*, U.S. DEP’T OF HEALTH AND HUM. SERVICES, <https://www.hhs.gov/hipaa/for-professionals/privacy/index.html> [https://perma.cc/E3HT-U6WL].

218. See *id.*; see also 45 C.F.R. §§ 160, 164(A), (E) (2013).

219. See HIPAA Administrative Simplification, 45 C.F.R. §§ 160–164 (2013).

220. See OFFICE OF CHIEF COUNSEL, FED. AVIATION ADMIN., STATE AND LOCAL REGULATION OF UNMANNED AIRCRAFT SYSTEMS (UAS) 1–3 (2015), https://www.faa.gov/uas/resources/policy_library/media/UAS_Fact_Sheet_Final.pdf [https://perma.cc/Y283-9AVG] (providing an overview of information about the federal regulatory framework for UAVs).

221. 49 U.S.C. § 40103(a)(1) (2018).

222. FLIGHT STANDARDS SERV., FED. AVIATION ADMIN., PILOTS HANDBOOK OF AERONAUTICAL KNOWLEDGE, at 15-2 (2016), https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/17_phak_ch15.pdf [https://perma.cc/KVC2-HG9J].

223. Matthew Johnston, *Differences Between Airspace Classifications*, CAL. AERONAUTICAL U.: CALAERO BLOG (Nov. 8, 2018), <https://calaero.edu/differences-between-airspace-classifications/> [https://perma.cc/9N2C-B4J9].

224. See *id.*

225. See *United States v. Causby*, 328 U.S. 256, 264 (1946). In *United States v. Causby*, the Supreme Court held that landowners have “exclusive control of the immediate reaches of the enveloping atmosphere” and “[t]he landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land.” *Id.* This is a notable deviation from Roman law, which held: *Cuius est solum, eius est usque ad coelum et ad inferos* (“Whoever owns the land it is theirs up to the heavens and down to hell.”). A DICTIONARY OF LAW 166–67 (Jonathan Law ed., 8th ed. 2015).

regulations rather than simple ones.²²⁶ There may generally be a trade-off between discretion and complexity. While prior scholarship seems to assume that startups would generally benefit from simpler regulations,²²⁷ this does not account for the discretion/complexity trade-off. In fact, RD has been observed only in industries whose regulations are highly complex. Holding everything else—including discretion—constant, a simpler regulation is more RD friendly than a complex one, as the RD can offer a greater contribution by lowering regulatory information costs. Entrepreneurs may see a greater market opportunity in providing solutions to complex regulations rather than simple ones.²²⁸ As mentioned above, so long as the regulation is ultimately comprehensible, its complexity will not necessarily stifle RD.

There are two countervailing issues that counsel against the use of complex regulations to foster RD. The first is an endogeneity problem, namely, that discretion and complexity generally correlate inversely.²²⁹ A regulation that gives regulators a great deal of discretion can often be much simpler than a regulation accounting for most cases—although regulatory simplicity may have no correlation with regulatory burden.²³⁰

V. IMPLICATIONS FOR POLICY

This Article is not the first to recognize that regulations have a disparate impact upon startups.²³¹ Others have proposed various solutions to this problem.²³² This new finding contributes to the conversation on how to make regulations better for entrepreneurs and encourage small business innovation. In particular, this Part discusses how regulatory democratization has an

226. Suggestions for testing this hypothesis are found in the Conclusions, *infra* notes 292–97.

227. *See supra* Section IV.B.1.

228. Suggestions for testing this hypothesis are found in the Conclusions, *infra* notes 292–97.

229. *See supra* Section IV.B.2.

230. For example, our fundamental antitrust regulation is incredibly simple. The Sherman Antitrust Act prohibits restraints of trade in just one sentence: “Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is hereby declared to be illegal.” 15 U.S.C. § 1 (2018). Antitrust law holds that a contract in unreasonable restraint of trade is illegal. *Standard Oil Co. of N.J. v. United States*, 221 U.S. 1, 87 (1911) (Harlan, J., concurring and dissenting). However, there is still much dispute over what restraints are “reasonable” in various contexts, each subject to a full-blown jury trial with fact-intensive analysis. *See* Mark C. Anderson, *Self-Regulation and League Rules Under the Sherman Act*, 30 CAP. U. L. REV. 125, 128–30 (2002). In fact, despite antitrust law being founded on one of the simplest statutes in the books, antitrust cases are some of the most expensive to litigate. Jonathan M. Jacobson, *From the Section Chair: Tackling the Time and Cost of Antitrust Litigation*, 32 ANTITRUST 3, 3–4 (2017).

231. *See, e.g.*, Pollman & Barry, *supra* note 17.

232. *See, e.g., id.* at 430–47.

impact on three proposed solutions: regulatory sandboxes, information-sharing networks, and tax credits. Deregulation is also addressed.

A. Regulatory Sandboxes

Regulatory sandboxes are touted as a promising way for regulators to partner with startups in experimenting with more efficient regulations.²³³ In this scheme, a regulator grants a specific startup a variance on a regulation or order to permit that startup to experiment with a new technology in a live environment for a limited time.²³⁴ Theoretically, this should provide safe spaces for innovation.²³⁵

To date, however, reality has not matched this promise. Indeed, the finding of RD suggests that regulatory sandboxes are theoretically unlikely to improve the disparate impact of regulation on startups and especially small businesses.²³⁶

To the extent that the regulatory sandbox approach has been employed at all, its use has generally been limited to financial technologies.²³⁷ The regulatory sandbox process is most predominately employed by the Financial Conduct Authority (FCA),²³⁸ a financial regulator in the United Kingdom who operates independently of the UK government,²³⁹ much like the Financial Industry Regulatory Authority (FINRA) does in the United States.²⁴⁰ The FCA's process allows innovative firms to approach the FCA via its Innovation

233. *The Role of Regulatory Sandboxes in Fintech Innovation*, *supra* note 31.

234. Mike Faden, *Regulatory Sandboxes Provide "Safe Spaces" for Fintech Payment Services Innovation*, AM. EXPRESS, <https://www.americanexpress.com/us/foreign-exchange/articles/regulatory-sandboxes-for-innovative-payment-solutions> [<https://perma.cc/P2SQ-LDFD>] (citing FIN. CONDUCT AUTHORITY, REGULATORY SANDBOX 9 (2015), <https://www.fca.org.uk/publication/research/regulatory-sandbox.pdf> [<https://perma.cc/3HPU-EWFR>]).

235. *See id.*

236. *See supra* Part IV.

237. *See, e.g.*, Allen, *supra* note 31, at 579; Faden, *supra* note 234. Note that legal scholarship actually defines regulatory sandbox narrowly to pertain to financial technology. *E.g.*, Allen, *supra* note 31, at 579 (2019) ("A regulatory sandbox allows fintech startups to conduct a limited test of their products with fewer regulatory constraints, less risk of regulatory enforcement action, and ongoing guidance from regulators. . .").

238. *See generally* FIN. CONDUCT AUTHORITY, *supra* note 234.

239. *About the FCA*, FIN. CONDUCT AUTHORITY (Apr. 21, 2016), <https://www.fca.org.uk/print/about/the-fca> [<https://perma.cc/924V-2UVF>].

240. *About FINRA*, FIN. INDUSTRY REG. AUTHORITY, <https://www.finra.org/about> [<https://perma.cc/TN3K-X8YJ>] ("FINRA is not part of the government. We're a not-for-profit organization authorized by Congress to protect America's investors by making sure the broker-dealer industry operates fairly and honestly.").

Hub and request a no enforcement action letter (NAL),²⁴¹ obtain individual guidance,²⁴² or seek a waiver²⁴³ to offer novel financial products or services.

Congress showed some interest in implementing a regulatory sandbox in the United States.²⁴⁴ Also known as the McHenry Bill for its sponsor, Rep. Patrick McHenry (R-NC), the Financial Services Innovation Act would create a new Financial Services Innovation Office (FSIO) in each of the federal financial agencies.²⁴⁵ Each FSIO would have a process whereby startups could propose an alternative compliance strategy for a financial innovation that serves the public interest, improves access to financial products and services, and does not present systemic risk while promoting consumer protection.²⁴⁶ But the bill, introduced in 2016, has not yet seen any action in the House of Representatives.²⁴⁷

Moreover, such a bill is unlikely to have a substantial impact on the disparate impact of regulation on startups. First of all, the McHenry Bill is limited to FinTech.²⁴⁸ Second, based on the length of time that the McHenry Bill has already sat in Congress, and the time-consuming process that

241. FIN. CONDUCT AUTHORITY, *supra* note 234, at 9 (“We could issue a NAL stating that no FCA enforcement action will be taken against testing activities where we are reasonably satisfied that the activities do not breach our requirements or harm our objectives. We think it would be appropriate for the FCA to reserve the right to close the trial. The FCA’s commitment not to take enforcement action applies to the period from the issue of the NAL until the testing is completed or closed by the FCA. The US Consumer Financial Protection Bureau (CFPB) is implementing a similar policy.”).

242. *Id.* (“In addition to NALs, the FCA can issue individual guidance to a firm on the interpretation of applicable rules in respect of testing activities the firm may be carrying out. If the firm acts in accordance with this guidance, it will give them certainty that the FCA would not take action against them.”).

243. *Id.* (“Where it is clear that testing activities do not meet our rules but the firm can meet the waiver test and the rules are within the FCA’s power to waive, the FCA can waive or modify particular rules for sandbox firms. A waiver or modification would allow what would otherwise be a temporary breach of our rules. The FCA is limited in what it can waive by EU legislative requirements. This is not an option for firms not regulated under FSMA (e.g. payment institutions).”).

244. See Financial Services Innovation Act of 2016, H.R. 6118, 114th Cong. (2016).

245. See *id.* The federal financial industries contemplated by this bill are: CFPB, CFTC, FCA, FDIC, FHFA, FRB, FTC, HUD, OCC, NCUA, Treasury, and SEC. AM. LAND TITLE ASS’N, FINANCIAL SERVICES INNOVATION ACT 6 (2016), <https://www.alta.org/file.cfm?name=McHenry-Bill-Explainer> [<https://perma.cc/4M7Q-M4EP>].

246. *Id.* at 14–15.

247. JD Alois, *Financial Services Innovation Act Seeks to Mandate Innovation Offices in Federal Agencies that Impact Fintech*, CROWD FUND INSIDER (Oct. 21, 2019), <https://www.crowdfundinsider.com/2019/10/153145-financial-services-innovation-act-seeks-to-mandate-innovation-offices-in-federal-agencies-the-impact-fintech/> [<https://perma.cc/RBQ2-N77J>].

248. See McHenry, *Meeks Introduce Fintech Bill to Encourage Greater Financial Inclusion*, U.S. CONGRESSMAN PATRICK MCHENRY (July 19, 2017), <https://mchenry.house.gov/news/documentsingle.aspx?DocumentID=398631> [<https://perma.cc/5TBK-7YMW>].

would be required for an agency to process a proposal for an alternative compliance strategy, it is hard to believe that this cumbersome process will be fast enough to support startup innovation.

But most troublesome is the ambiguous nature of the standards for having a regulatory sandbox proposal approved. The McHenry Bill and other proposals for regulatory sandboxes give a broad range of discretion to regulatory agencies.²⁴⁹ Discretion is the functional opposite of certainty. Startups will have a hard time determining in advance if or when a request will be granted. Moreover, incumbents are more able to take advantage of this process. Large established firms, that already have relationships with regulators, will be in a better position to get their requests approved as opposed to startups who are not familiar with the process. Even scholars who are proponents of the sandbox approach recognize that incumbents could be able to game the system.²⁵⁰

RD teaches us that vague standards and regulatory discretion are anathema to entrepreneurial innovation. It is the large and old companies who have established relationships with regulators who are most likely to benefit from sandboxes. For most startups and small businesses, however, these bogeys are regulatory sand traps.

B. Regulatory Information Sharing Regimes

Several scholars have theorized that regulatory costs—especially information costs—could be mitigated by either mandatory or voluntary networks that share information about regulations. For example, “connected contracts” could lead to collaborative economic activity.²⁵¹ One scholar even described such information-sharing networks in the real world.²⁵²

249. See, e.g., Allen, *supra* note 31, at 582.

250. Eyal-Cohen, *supra* note 10, at 910 (“[T]he government will need to place safeguards to prevent certain old-timers from gaming and using such regulatory sandboxes to their benefit.”).

251. G. Mitu Gulati, William A. Klein & Eric M. Zolt, *Connected Contracts*, 47 UCLA L. REV. 887, 894–95 (2000) (“This metaphor, called ‘connected contracts,’ emphasizes the complex interactions among all of the participants in an economic venture. . . . Connected contracts broadens the scope of analysis to invite attention to the cooperation, conflict, competition, and compromise among equity investors, lenders, managers, workers, suppliers, customers, and all others who contribute to an economic endeavor . . .”).

252. See Darian M. Ibrahim, *Financing the Next Silicon Valley*, 87 WASH. U. L. REV. 717, 727 (2010) (“Silicon Valley is home to unique sociological networks and an open and sharing entrepreneurial culture, even among high-tech competitors.”).

But there are fundamental theoretical problems that would preclude regulatory information sharing networking from being a stable solution to the problem of the disparate impact of regulation on startups.

First and foremost, this would necessitate sharing of information. However, startups are in competition with each other. Knowledge about regulations would give one startup a competitive advantage over others.²⁵³ So, why would one startup voluntarily share information that was costly for it to obtain with another competing startup? Generally, competitors do not give away their competitive advantage to rivals for nothing.²⁵⁴ Indeed, doing so could amount to corporate waste and a violation of fiduciary duties.²⁵⁵

Perhaps they would share information if there is some expectation of quid pro quo. Even if this is the case, such information sharing relationships are unlikely to be stable. Once groups of startups reach any reasonable size, they are prone to free-riding problems, coordination problems, and collective action problems.²⁵⁶ These groups are similar to conspiracies, oligopolies, and cabals, which are notoriously unstable and prone to cheating.²⁵⁷

Moreover, such information sharing groups may not even be legal. Competitors sharing information may violate antitrust laws.²⁵⁸ If any competitor is left out of the group, it may claim that its omission constitutes an illegal group boycott, a violation of the Sherman Act.²⁵⁹ This is not mere theorizing. Such a case came before the Supreme Court in 1985, when Pacific Stationary was ostracized from a group of office suppliers called Northwest Wholesale Stationers.²⁶⁰ In that case, the Supreme Court held that an information sharing group may violate antitrust law where it possesses “market power or unique access to a business element necessary for effective

253. See Eyal-Cohen, *supra* note 10, at 904 (“[R]egulatory information is a competitive advantage that many newcomers would prefer not to share once obtained.”).

254. See, e.g., *id.* But see Ibrahim, *supra* note 252, at 727 (noting an open source trend in Silicon Valley).

255. ALAN PALMITER, FRANK PARTNOY, & ELIZABETH POLLMAN, *BUSINESS ORGANIZATIONS: A CONTEMPORARY APPROACH* 84–85 (3d ed. 2019).

256. See George J. Stigler, *Free Riders and Collective Action: An Appendix to Theories of Economic Regulation*, 5 BELL J. ECON. & MGMT. SCI. 359, 359, 364–65 (1974).

257. See Stiglitz, *supra* note 39, at 19 & n.6.

258. Barak D. Richman, *The Antitrust of Reputation Mechanisms: Institutional Economics and Concerted Refusals to Deal*, 95 VA. L. REV. 325, 352 (2009) (“A common facilitating practice that has been found to violate the Sherman Act is an agreement between competitors to exchange information on prices or output. Such coordination draws scrutiny because it enables illegal collusion even in the absence of an explicit agreement to collude.”).

259. See *id.* at 347–48.

260. *Nw. Wholesale Stationers, Inc. v. Pac. Stationery & Printing Co.*, 472 U.S. 284, 285–88 (1985).

competition.”²⁶¹ Such information about regulations could be considered a business element necessary for effective competition.²⁶²

In sum, regulatory information sharing networks are rarely observed in the world, theoretically unstable, and potentially illegal as a violation of antitrust law if all firms do not have equal access to the information. Therefore, they are not a viable solution to the problem of the disparate impact of regulations on startups.

C. Tax Credits for Startups

Regulation and taxation are two sides of the same coin. They both represent a cost whose incidence may be borne by either the supplier or the consumer, depending on the ratio of the elasticities of supply and demand.²⁶³ Accordingly, some have advocated for either additional taxes on incumbents,²⁶⁴ or a tax credit toward startups.²⁶⁵ This is not an article on tax policy per se, so it will provide only a brief discussion of why both of these tax-based solutions are unlikely to work.

Tax burdens on incumbents generally have the impact of increasing prices and lowering quality for consumers.²⁶⁶ However, this negative externality can be countered with a positive impact, if such taxation simultaneously increases competition. Whether or not this is likely to occur is a very

261. Eyal-Cohen, *supra* note 10, at 903 (citing *Nw. Wholesale Stationers, Inc.*, 472 U.S. at 290).

262. *Id.*

263. Who pays for a tax, more formally known as the “incidence of cost,” was first presented in 1924 by economist T.N. Carver, who asked the question, “Who bears the burden of extra costs?” T.N. Carver, *The Incidence of Costs*, 34 *ECON. J.* 576, 576, 588 (1924). When does the producer, the consumer, or some ratio of both bear the extra costs? “The general answer is, that it depends upon the commodity on which the new charge is laid, or, more specifically, upon the ratio of the elasticity of the supply of the commodity to that of the demand for it.” *Id.* at 578.

264. See JOSEPH W. ROSENBERG & DONALD B. MARRON, *TAX POLICY CTR., TAX POLICY AND INVESTMENT BY STARTUPS AND INNOVATIVE FIRMS* 23–25 (2015), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2573259 [<https://perma.cc/GM8A-LL7Y>].

265. *Id.* at 3 (“The R&E tax credit, for example, is intended to foster innovative investment, and the capital gains tax exemption for long-term investments in startups is intended to encourage equity investment in new ventures.”).

266. See, e.g., Douglas J. Young & Agnieszka Bielinska-Kwapisz, *Alcohol Taxes and Beverage Prices*, 55 *NAT’L TAX J.* 57, 58 (2002) (“The evidence from this study indicates that alcohol taxes are over-shifted to consumers. For example, the Federal excise tax on beer increased by \$9 per barrel in 1991. It is estimated to have increased retail prices by \$15 to \$17.”).

technical question that is beyond the scope of this Article. On the one hand, taxing larger firms could give smaller firms a cost advantage. On the other hand, larger firms tend to have more market power, and market power allows firms to pass on the tax burden to consumers.²⁶⁷ Whether or not a tax on incumbents will increase social welfare in highly regulated industries is a question that must be answered empirically and specifically in each different market.

There are practical problems with any tax regime that is designed to encourage entrepreneurial innovation. How does one determine which entities shall be taxed? Any line-drawing between the taxed and the untaxed invites firms to change their behavior to avoid being taxed.²⁶⁸ This is inefficient in that it may require firms to produce a suboptimal amount of output or to engage in other gamesmanship.²⁶⁹

Moreover, the utility of tax credits is limited for startups whose business model does not contemplate being profitable for several years.²⁷⁰ Tax credits for startups are only useful when a startup is incurring tax liability.²⁷¹ Tax liability arises from profits, but startups are often unprofitable in their formative years.²⁷² Some “startups” remain unprofitable for over a decade and remain unprofitable even when they have grown so large as to be better seen as incumbents.²⁷³ Indeed, some have opined that the hallmark of a high-growth startup is its ability to channel all potential profits into accelerating growth.²⁷⁴

Accordingly, whether or not compensatory tax instruments will encourage entrepreneurial innovation remains an open question. On the one hand, it

267. See Clemens Fuest, Dominik Schober & Oliver Woll, *Does Market Power Allow Firms to Pass on More of the Tax Burden to Consumers? Evidence from Gasoline Tax Reforms in Austria*, 108 NAT'L TAX ANN'S ANN. CONF. ON TAXATION PROC. 1, 1 (2005), <https://ntanet.org/wp-content/uploads/proceedings/2015/139-fuest-schober-woll-market-power-allow-firms-pass.pdf> [<https://perma.cc/G8HK-24T7>].

268. Cf. Zoë Prebble & John Prebble, *The Morality of Tax Avoidance*, 43 CREIGHTON L. REV. 693, 702 (2010).

269. See, e.g., *id.* at 707.

270. See Susan C. Morse & Eric J. Allen, *Innovation and Taxation at Start-up Firms*, 69 TAX L. REV. 357, 357–59 (2016).

271. See *id.*

272. See *id.*

273. See, e.g., Seth Fiegerman, *Twitter Records Its First Annual Profit, but It Is Losing Millions of Users*, CNN BUS.: MKTS NOW (Feb. 7, 2019, 1:20 PM), <http://cnn.com/2019/02/07/tech/twitter-earnings-q4/index.html> [<https://perma.cc/24H2-WPKQ>]. For example, Twitter turned its first annual profit in 2018, eleven years after it was incorporated on April 19, 2007. See *id.*; *Restated Certificate of Incorporation of Twitter, Inc.*, U.S. SEC. & EXCHANGE COMMISSION, <https://www.sec.gov/Archives/edgar/data/1418091/000119312513390321/d564001dex31.htm> [<https://perma.cc/2YCM-E4MQ>].

274. See Alison Coleman, *Profitability Versus Growth: A Balancing Act*, FORBES (Mar. 4, 2018, 1:20 PM), <https://forbes.com/sites/alisoncoleman/2018/03/04/profitability-versus-growth-a-balancing-act-for-startups/#6f794a1d3e3e> [<https://perma.cc/Z5UL-HA4G>].

is theoretically possible to use taxes to discourage monopoly and encourage competition.²⁷⁵ On the other hand, calculating the appropriate tax rate is both an art and a science. We might be skeptical that regulators or lawmakers who impose these tax policies design efficient equations, especially where they may be influenced—or even captured²⁷⁶—by the incumbents in that regulated industry.²⁷⁷

D. Deregulation?

Deregulation is an obvious solution to the problems of regulation. Of course, regulations exist for theoretical reasons such as fostering public interests and enforcing market discipline, although these theories have also been questioned in the literature.²⁷⁸ It is beyond the scope of this Article to discuss whether regulation or deregulation is generally preferable. However, this Article can shed light on the debate, as its finding of the emergence of RD impacts analysis of the cost of regulation.

There are two main schools of thought when it comes to deregulation. The more extreme school advocates for total deregulation.²⁷⁹ The more moderate school advocates for deregulating small firms. This moderate regulatory philosophy was expressed in legislation through the Small Business

275. *But see* Casey Mulligan, *Monopolies Are Unhealthy but High Taxes Make the Disease Worse*, HILL (Mar. 30, 2018, 2:00 PM), <https://thehill.com/opinion/finance/381001-monopolies-are-unhealthy-but-taxes-make-the-disease-worse> [https://perma.cc/K2YG-SVUG].

276. Regulatory capture is a state of affairs where a legislature or administrative agency regulates in an industry's interest, as opposed to regulating in the public interest. *See* Alan Schwartz & Robert E. Scott, *The Political Economy of Private Legislatures*, 143 U. PA. L. REV. 595, 644 (1995). "A lawmaker is captured when it chooses 'a policy which would not be ratified by an informed polity free of organization costs.'" *Id.* (quoting Michael Levine & Jennifer Forrence, *Regulatory Capture, Public Interest, and the Public Agenda: Toward a Synthesis*, 6 J.L. ECON. & ORGANIZATION 167, 178 (1990)).

277. *See, e.g., supra* notes 106–08 and accompanying text.

278. *See, e.g.,* Andrei Shleifer, *Understanding Regulation*, 11 EUR. FIN. MGMT. 439, 443 (2005). Regulation versus deregulation of businesses is a broad debate that connects in some ways to the even larger issue of the trade-off between dictatorship and disorder. Whether regulations increase or decrease social welfare may be a function of the nature of the activity being regulated and the characteristics of the society in which the regulation takes place. *See id.* Moreover, there is scholarly disagreement about whether efficiency is even the right metric to use when evaluating whether more or less regulation is desirable. Other metrics may include justice, stability, or perceptions of fairness. *See id.*

279. *See, e.g.,* Richard A. Epstein & David A. Hyman, *Fixing Obamacare: The Virtues of Choice, Competition, and Deregulation*, 68 N.Y.U. ANN. SURV. AM. L. 493, 516 (2012).

Regulatory Enforcement Fairness Act.²⁸⁰ Government regulators often exclude or exempt small businesses from a number of regulations.²⁸¹ These exemptions include securities registration and reporting requirements,²⁸² labor and employment rules,²⁸³ as well as health and safety guidelines.²⁸⁴

But such small business exemptions do not solve the problem. For one thing, small businesses must expend costs to determine whether the exclusionary rule applies to them.²⁸⁵ As these exclusionary rules change, small firms must continue to expend resources to stay abreast of those changes. Third parties must also expend resources to determine whether a firm they are dealing with is regulated or exempt.²⁸⁶

Perhaps more problematically, small firms may change their behavior in otherwise inefficient ways in order to fit into the exemption.²⁸⁷ For example, a small business may choose not to hire an additional worker in order to stay under the limit for mandatory provision of health insurance.²⁸⁸ Likewise,

280. See 5 U.S.C. § 601 (2018). Some scholars have written specifically on the misguided nature of that act. See Richard J. Pierce, Jr., *Small Is Not Beautiful: The Case Against Special Regulatory Treatment of Small Firms*, 50 ADMIN. L. REV. 537, 538 (1998).

281. See Mirit Eyal-Cohen, *Down-Sizing the “Little Guy” Myth in Legal Definitions*, 98 IOWA L. REV. 1041, 1065–86 (2013) (outlining small business deregulation in various areas of the law).

282. See, e.g., *Emerging Growth Companies*, U.S. SEC. & EXCHANGE COMMISSION, (July 24, 2019), <https://sec.gov/smallbusiness/goingpublic/EGC> [<https://perma.cc/9S5W-MYUC>] (“If your company qualifies as an ‘emerging growth company’ as defined in Section 2(a)(19) of the Securities Act, it may choose to follow disclosure requirements that are scaled for newly public companies.”).

283. See, e.g., *Family Help*, INTERNAL REVENUE SERV. (Jan. 16, 2020), <https://irs.gov/businesses/small-businesses-self-employed/family-help> [<https://perma.cc/PPU2-3CYN>] (describing Federal Unemployment Tax Act (FUTA) exemptions for small family-run businesses).

284. See, e.g., 29 C.F.R. § 1904.1 (2019) (describing OSHA rule exemptions for employers with less than ten employees).

285. Cf., e.g., Allen Smith, *Weigh Risks in Using FFCRA’s Small-Business Exemption*, Soc’y for Hum. Resource Mgmt. (May 1, 2020), <https://www.shrm.org/resourcesandtools/legal-and-compliance/employment-law/pages/coronavirus-ffcra-small-business-exemption.aspx> [<https://perma.cc/7239-GGX6>].

286. See C. Steven Bradford, *Does Size Matter? An Economic Analysis of Small Business Exemptions from Regulation*, 8 J. SMALL & EMERGING BUS. L. 1, 25 (2004) (“[E]xemptions sometimes increase the information costs of unregulated third parties who may need to distinguish between regulated and unregulated firms.”).

287. See *id.* (“Exemptions also encourage wasteful strategic behavior by firms seeking to avoid regulation.”).

288. See William E. Even & David A. Macpherson, *The Affordable Care Act and the Growth of Involuntary Part-Time Employment*, 72 INDUS. & LAB. REL. REV. 955, 955–56 (2019) (“At its passage, the 2010 Affordable Care Act (ACA) required that firms with 50 or more employees provide health insurance for their full-time workers or be subjected to penalties beginning in 2014. Many analysts argued that the law created incentives for large firms to shift from full-time to part-time workers to escape the penalties and the cost of providing health insurance.”).

many firms hire part-time employees to work thirty hours per week or less to avoid paying for employee benefits.²⁸⁹ Some have even argued that this artificial bifurcation between regulated and exempt firms is an immoral double standard.²⁹⁰

Others have argued that the seemingly moderate position of deregulating small firms is foolish; rather, they argue that the better approach is a sweeping reduction of regulations for all firms, which can best be summed up in the phrase “Deregulate Now!”²⁹¹ It is simply beyond the scope of this Article to address in any meaningful way the arguments for and against sweeping deregulation. Of course, deregulation would eliminate many of the problems with regulations. However, many would argue that regulations exist for a reason. Others would counter-argue that those reasons are primarily based on power and politics.

For the instant purposes of this Article, it is not necessary to resolve the regulation versus deregulation debate writ large. Rather, the Article’s contribution is that not all regulation is created equal. Granting broad discretion to regulators through vague standards may have more negative

289. Kara E Shae, *Risks of ACA Avoidance Strategies for Employers*, HR DAILY ADVISOR (Nov. 1, 2013), <https://hrdailyadvisor.blr.com/2013/11/01/risks-of-aca-avoidance> [<https://perma.cc/EG8D-4FXE>] (“Already, several ACA avoidance strategies, including layoffs, downsizing . . . moving employees from full- to part-time status, and replacing employees with a contract workforce, have made headlines.”). Under ObamaCare, the hourly threshold to be considered “full-time” is thirty hours. See Cynthia J. Borrelli, *Affordable Care Act Compliance from the Employer’s Perspective*, N.J. LAW., Apr. 2016, at 35, 35 (“A full-time employee is an individual employed at least 30 hours per week, on average.”).

290. See, e.g., Ruben H. Arredondo, *Different Strokes for Different Folks: Balancing the Treatment of Employers and Employees in Employment Discrimination Cases in Courts within the Tenth Circuit Court of Appeals*, 16 BYU J. PUB. L. 261, 285 (2002) (“As a practical matter, state and federal legislation have different protections for workers employed by small businesses and those employed by larger employers, which is essentially a double standard. As a policy matter, it sends a message that though elimination of workplace discrimination is important for some of the workforce, it is not important enough to cover the entire workforce.”); Seth C. Oranburg, *Unbundling Employment: Flexible Benefits for the Gig Economy*, 11 DREXEL L. REV. 1, 3–4 (2018).

291. See Epstein & Hyman, *supra* note 279, at 495 (The “[Patient Protection and Affordable Care Act]’s [(PPACA)] fundamental design defect was to superimpose additional layers of regulation and subsidies on a system that was already top-heavy with both. These preexisting regulations and subsidies have already misaligned the incentives within the health care system. The next generation of rules will only compound the errors. In our view, the right approach to these problems is to promptly initiate a program of systematic deregulation that will introduce the choice and competition to which PPACA gives, at best, lip service.”); Richard A. Epstein, *Deregulate Now*, HOOVER DIGEST (Apr. 21, 2010), <https://www.hoover.org/research/deregulate-now> [<https://perma.cc/5N3M-9KQE>].

consequences for entrepreneurial innovation than instituting rules that apply equally and straightforwardly to all firms. According to RD, deregulatory efforts should focus on identifying regulations where regulators have too much discretion.

VI. CONCLUSIONS

Most scholars agree that regulation is at odds with innovation.²⁹² Some have even described innovation as a square peg that does not fit in the round hole of regulation.²⁹³ But this Article hoped to show that not all regulations are created equal. A more nuanced view of regulatory regimes, using the axes of rules versus standards and simplicity versus complexity, can shed light onto the design of optimal regulations.

This Article has shown how startups are creating RD technologies that help other startups and small businesses comply with regulations. This changes the regulatory landscape by leveling the playing field for entrepreneurial innovation. Future studies of the impact of regulation should consider how RD may change the incidence of regulatory cost on startups and small businesses.

Moreover, this positive observation leads to normative policy suggestions. In particular, regulators should consider the nature of the regulation in addition to the amount of regulation. Regulations that have a vague, standard-like nature are more likely to have a disparate impact on small businesses, whereas regulations that can be addressed by computers may not depress entrepreneurial innovation as much.

Entrepreneurs face many barriers to entry, but *regulators* should be particularly concerned about *regulatory* barriers to entry, as this is something ostensibly in their direct control. If business regulations can be designed more efficiently, should they not be? This Article hoped to show how regulatory rules might be better than regulatory standards insofar as rules are more compatible with technological solutions, such that rule makers should try to craft rules that can be addressed by RD solutions.

I termed this process regulatory *democratization* because democratization is the action of making something accessible to everyone.²⁹⁴ Likewise, RD firms make regulatory compliance accessible for a wider range of startups and small businesses. Lowering the cost of regulatory compliance makes

292. See, e.g., Wulf A. Kaal & Robert N. Farris, *Innovation and Legislation: The Changing Relationship—Evidence from 1984 to 2015*, 58 JURIMETRICS J.L., SCI., & TECH. 303, 304 (2017).

293. See Mark Lavender, *Regulating Innovative Medicine: Fitting Square Pegs in Round Holes*, 2005 DUKE L. & TECH REV. 1, 2, <https://dltr.law.duke.edu/2005/01/13/regulating-innovative-medicine-fitting-square-pegs-in-round-holes/> [<https://perma.cc/6KPJ-3DKU>].

294. See *Democratization*, OXFORD ENGL. DICTIONARY (3d ed. 2014).

it easier for more businesses to enter regulated markets. RD firms lower the cost of regulatory compliance by creating new technological products and services that solve regulatory problems for a large number of other startups and small businesses. Theoretically, the result of this process is a more competitive and therefore efficient market, despite a high degree of regulation.

This finding counsels against the idea that regulatory inefficiency should be remedied with additional regulatory apparatuses.²⁹⁵ A priori, the notion that more regulations will solve the problems caused by regulations does not make sense.²⁹⁶ Moreover, this Article has shown that increasing regulatory discretion—via regulatory sandboxes—is likely to further depress entrepreneurial innovation from small and young firms.

Indeed, it may be the case that the best regulatory solution is no solution. RD occurs where the free market, powered by technology, solves regulatory problems on its own.

This theory should be tested empirically. Fortunately, on the horizon are new tools for measuring the impact of regulation.²⁹⁷ This Article theorized that rules and standards may have a different impact on regulation, especially as a function of firm size and age, and these variables should be considered in empirical analysis of regulation.

There is much more to learn and understand about the relationship between regulation and entrepreneurial innovation. The finding of RD shows that regulations have complex impacts on startup decision-making, but what are the individual, environmental, and industry conditions that will impact an entrepreneur's decision to create a RD solution? How does RD impact entry, form, and performance in regulated markets? What is the impact of regulatory democratization on net social welfare? The Author hopes this

295. See Eyal-Cohen, *supra* note 10, at 886–87 (“Our economy and society as a whole lose when innovations are placed on hold or barred from entering the marketplace. It reflects poorly on the government when its action might be one of the reasons for this outcome.”).

296. See *id.* at 865.

297. See Michael Simkovic & Miao Ben Zhang, *Measuring Regulation* 1 (Univ. of S. Cal. Law Sch., Legal Studies Working Paper No. 298, 2019), <https://law.bepress.com/cgi/viewcontent.cgi?article=1433&context=usclwps-lss> [<https://perma.cc/B2VX-C9KQ>]. For example, Michael Simkovic and Miao Ben Zhang developed a new method to measure the intensity of regulation. See *id.* The availability of their Regulation Index and others' efforts to make regulatory impact quantifiable may help researchers conduct empirical analysis on the impact of regulation on entrepreneurial innovation. See *id.*

Article inspires other scholars to challenge the ideas stated herein and move us closer to a theory of optimal regulation.