Exploring How Regulations Shape Technology Startups

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Liya Palagashvili. "Exploring How Regulations Shape Technology Startups." Mercatus Research, Mercatus Center at George Mason University, Arlington, VA, May 2021.

ABSTRACT

How do regulations shape young technology startups? This paper provides the descriptive findings from novel data collection of fieldwork interviews and surveys of technology startups in the United States and covers the topics of industry regulations, use of legal counsel, contractor labor, high-skilled foreign workers, and patents. The paper finds evidence that regulations are influencing technology startups' business directions, products, and margins of innovation and that federal or industry regulations have the most influence. About 70 percent of startup executives believe they operate in a moderately or highly regulated industry. There is also some evidence that startups in highly regulated industries face a barrier to obtaining venture capital funding. The paper finds that a majority of startups rely on contract labor because they require flexibility and face uncertainty in their early stages. Moreover, survey results show that about one-third of technology startups hire employees or contractors who are high-skilled foreign workers and that startup executives indicate that they need greater access to the international market in order to grow and succeed.

JEL codes: L5, L26, M13

Keywords: regulation, entrepreneurship, technology startups, innovation

This paper can be accessed at https://www.mercatus.org/publications/regulation/exploring-how-regulations-shape-technology-startups

High-growth businesses, which are disproportionally composed of young firms, account for almost 50 percent of job creation in the United States.[1] Many of these high-growth young firms are technology enabled and sit at the heart of innovation.[2] Google—a three-person firm in 1998—grew into a 20,000-person firm in just 10 years. Today it employs 135,301 workers. The United States is continuing to witness significant growth in job creation among young, technology-enabled firms in industries such as IT services, software, advertising and marketing, financial services, and business services, among others.[3]

But while these technology entrepreneurs are attempting to expand the frontiers of innovation and generate work opportunities across the country, they are often stifled by policies and regulations—especially in their early years as small businesses. Research has indicated that regulations may disproportionally harm small businesses more than large ones,[4] but questions loom about how (and which type of) regulations impact young, innovation-driven technology startups. These entrepreneurial ventures are similar to a typical mom-and-pop business in that they tend to be small and resource constrained and have limited

1. Ryan Decker et al., "The Role of Entrepreneurship in US Job Creation and Economic Dynamism," *Journal of Economic Perspectives* 28, no. 3 (2014): 3–24; Jarmin Haltiwanger et al., "High Growth Young Firms: Contribution to Job, Output, and Productivity Growth," in *Measuring Entrepreneurial Businesses: Current Knowledge and Challenges*, ed. John Haltiwanger et al., Studies in Income and Wealth (Chicago: University of Chicago Press, 2017), 75.
2. Ian Hathaway, "High-Growth Firms and Cities in the U.S.: An Analysis of the Inc. 5000," Brookings Institution, February 5, 2018, https://www.brookings.edu/research/high-growth-firms-and-cities-in-the-us-an-analysis-of-the-inc-5000/.
3. Hathaway, "High-Growth Firms and Cities."
4. James Bailey and Diana Thomas, "Regulating Away Completion: The Effect of Regulation on Entrepreneurship and Employment," *Journal of Regulatory Economics* 52, no. 3 (2017): 237–54; Dustin Chambers, Patrick McLaughlin, and Tyler Richards, "Regulation, Entrepreneurship, and Firm Size" (Mercatus Working Paper, Mercatus Center at George Mason University, Arlington, VA, 2018); Peter Calcagno and Russel Sobel, "Regulatory Costs on Entrepreneurship and Establishment Employment Size," *Small Business Economics* 42, no. 3 (2013): 541–59.

cash flows. At the same time, young startups can quickly become large companies—as happened for companies like Google and Amazon and, in recent years, Uber and Airbnb.

How do regulations shape technology entrepreneurship? To the extent that technology startups are at the forefront of job growth and innovation in the US economy, it is important to unpack how the policy environment may be hindering, aiding, or changing the growth of these entrepreneurial ventures. The global COVID-19 pandemic has also heightened the importance of developing a favorable environment for entrepreneurs to scale, grow, and generate jobs.

Most of today's information regarding the regulatory impact on technology-enabled entrepreneurial ventures comes from scattered interviews and ad hoc discussions with relevant actors and through news articles.[5] To fill in the current gap in systematic information, my research team conducted fieldwork interviews and an online survey of technology entrepreneurs in the United States.[6] Our goal was to understand how the policy environment was influencing the ability of technology entrepreneurs to scale, grow, and innovate. Our study included only small, young technology startups because the goal was to understand the policy environment for early-stage ventures—the Google of 1998 or the Uber of 2009—small, young firms before they take off and become more established technology companies.

This research paper provides the descriptive findings from our data collection efforts to understand how policies and regulations are influencing technology entrepreneurship, which regulations matter most and at what level of government, and how different policies are changing the margins of innovation and job creation. These factors are important to identify because a better policy environment for technology entrepreneurs can unleash greater innovation and job creation in our economy.

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5. Descriptive data and surveys on entrepreneurship and regulation do currently exist, but none of these separate technology startups as a unique category (though many do separate small businesses as a unique group). The US Census Bureau's *Annual Survey of Entrepreneurs* is one of the most comprehensive surveys of entrepreneurs in the United States and contains a variety of questions on regulation. However, this survey captures the typical "small-to-medium-sized enterprises." There are other reports that track "high growth" companies or "technology companies," but none of these reports has the regulations component. Also, some of the reports that track "technology companies" are merely tracking large, established companies, and thus do not capture the category of young, high-growth technology startups that the survey and fieldwork interviews in this study address.
6. The original data collection for this paper was carried out at the Classical Liberal Institute at New York University School of Law, where co–principal investigators Richard Epstein, Liya Palagashvili, and Seth Oranburg received a grant from the Templeton Foundation. See "Startup Innovation: The Role of Regulation in Entrepreneurship," Templeton Foundation, accessed December 15, 2020, https://www.templeton.org/grant/startup-innovation-the-role-of-regulation-in-entrepreneurship.

Our findings provide a host of insights about the relationship between technology startups and regulation:

- *Technology startups in highly regulated industries.* When we looked at whether technology startups believe they are operating in highly regulated industries, we found that 41 percent of startup executives do indeed believe their industries are highly regulated and 29 percent believe they are in moderately regulated industries. This is significant because many startups in highly regulated industries face challenges as they seek to obtain venture capital funding. We also discovered that most entrepreneurs who believe they are operating in highly regulated industries are in the medical-related technology space.
- *Technology startups and the influence of federal or industry regulations.* We found that approximately 40 percent of entrepreneurs involved in technology startups say that government regulations influenced their business models or core products, and about 70 percent indicated that it was federal-level regulations that had the most influence. Specific startup stories illustrate precisely how regulations are influencing startups' business models and core products and deterring some innovation in certain regulated spaces.
- *Technology startups and use of legal counsel.* Our results indicate that 92 percent of startups have used outside legal counsel for purposes beyond incorporation, and a majority of them (64 percent) began using legal counsel within six months of incorporation. Startup executives indicated that they chose to work with legal counsel for several reasons, most frequently for help navigating regulations on venture capital and investor fundraising deals and for intellectual property concerns.
- *Technology startups and the need for flexible contract labor.* Our survey results show that 96 percent of startups have at least one employee and 79 percent of startups have at least one contractor. Moreover, most startup executives indicate that they have at least five employees or five contractors. Approximately 57 percent of startup executives indicate that the use of contractor labor is an indispensable or essential part of their business models. Additionally, we found that technology startups overwhelmingly use contractor labor because in their early stages they require flexibility and face limited funding and uncertainty that preclude committing to an employee. The legal and regulatory environment (California's in particular) seems to be embedded in the reason that startups need to use contract labor.
- *Technology startups and the need for high-skilled foreign workers.* We found that about one-third of technology startups in our sample hire employees

or contractors who are foreign workers. There is some indication that high-skilled foreign contractors are being used as a substitute for high-skilled foreign employees whom startups could not hire in the United States owing to the visa process. Startups need greater access to the international market in order to grow and succeed, though this necessity is stronger for startups in some US locations than for those in others.

Last, there are well-understood social benefits from regulation.[7] This paper does not address all aspects of regulation on technology entrepreneurship because my intention is not to do a cost-benefit analysis of whether regulation on technology entrepreneurship results in a net social benefit or social cost. Instead, I offer unique, descriptive findings from my research team's data collection efforts, detailing how regulation shapes technology entrepreneurs' businesses and margins of innovation. Understanding these costs and aspects of regulation ought to be integral to any serious discussion of the net benefits of regulation on startups.

1. METHODOLOGY

The descriptive findings presented in this paper come from both original fieldwork interviews and an online survey conducted in the United States. My research team conducted 88 fieldwork interviews in the United States between May and December 2017. Of the 88 unique interviews, 45 were with technology startup founders and executives, 12 with venture capital investors, 10 with accelerator or incubator directors, and the remaining 21 with various members of the technology startup ecosystem—including lawyers, startup advisers, researchers, and members of startup associations. The primary US cities included San Francisco and neighboring cites (Silicon Valley), New York City, Boston, Los Angeles, and San Diego. A handful of cities were also chosen as the "Silicon Prairie" cities—Austin, Texas; Pittsburgh; Omaha, Nebraska; Chicago; Denver; and Boulder, Colorado. Almost all the interviews were conducted in person and were recorded.

Interview subjects were chosen by various methods. For the first method, my research team created a set of "startup hub" cities. Then, using Crunchbase (a database of startups), the team created a list of startups in each city that we

7. See, for example, Edward Glaeser, Simon Johnson, and Andrei Shleifer, "Coase versus the Coasians," *Quarterly Journal of Economics* 116, no. 3 (2001): 853–99; Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, "What Works in Securities Laws?," *Journal of Finance* 61, no. 1 (February 2006): 1–32.

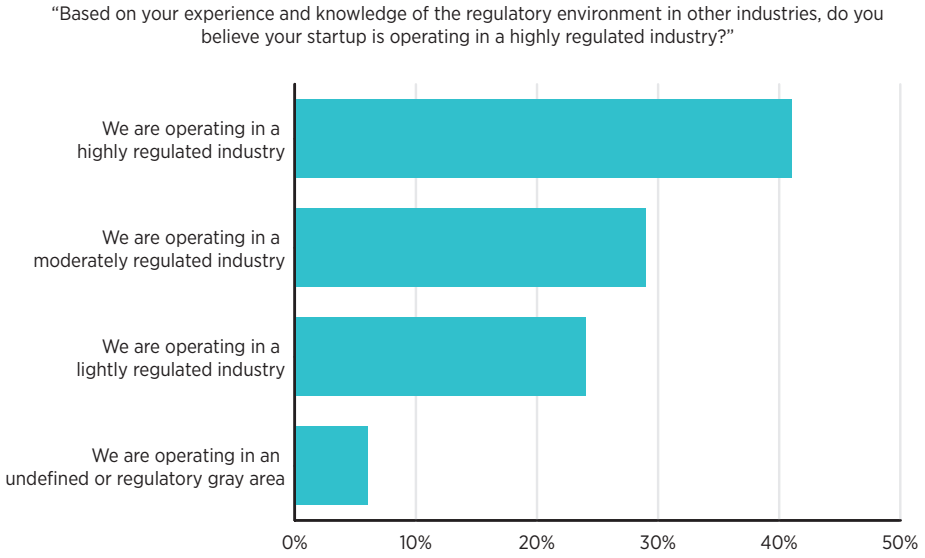
planned to visit. We included only privately held technology startups that had been founded less than seven years before and had not surpassed a Series C stage.[8] The second method was judgment sampling: we sought out specific firms in those cities because we knew that their perspective would be important for our research. Judgment sampling was used for venture capital firms and accelerators and incubators. For the third method, we used opportunity sampling. We spent considerable time in each startup hub city attending various startup conferences or events. At some of these events we met startup CEOs, investors, and accelerator or incubator directors, and we took the opportunity to make a connection and interview them as well. Fourth, we used snowball sampling. After some interviews, interviewees offered us a connection or introduction to other potential interviewees. Before we reached out to these potential interviewees, we researched them to make sure they were a fit for our study. Many of the interviewees obtained through snowball sampling were already in our original sample list.

To complement the fieldwork interviews, we conducted an online survey of technology startup executives in May 2019. The companies in this sample were restricted to technology startups that had been founded no earlier than 2012 and had fewer than 200 full-time employees by the time of the survey. Although a total of 408 technology executives completed the entire survey, the first sections of questions had up to 465 responses. The startups in the sample are headquartered in 42 US states and belong to a variety of industries, such as medical-related technology (medtech), finance technology (fintech), information services, media, retail/e-commerce, software, and transportation. All the respondents are executives, such as CEOs and COOs, and most are also the founders of their startup.

We collected our sample via three methods. For the first, we constructed a list of eligible company recipients using the PitchBook company database. Approximately 62 percent of our respondent sample comes from this database. For the second, we collected responses from an online panel provided by Facet Squared Market Research. Approximately 37 percent of our respondent sample comes from this panel. Finally, we constructed a list of venture capital and other investor contacts from the qualitative interviews. Only about 1 percent of our respondent sample comes from this list. We conducted checks to ensure that there were no significant differences in our findings based on the respondent samples.

8. Eliminating companies from the Series C stage ensured that larger or more established startups would not be in our analysis.

FIGURE 1. DO YOU BELIEVE YOUR STARTUP IS OPERATING IN A HIGHLY REGULATED INDUSTRY?



Survey questions were designed from topics that emerged in our fieldwork interviews. The survey consists of seven main sections: basic startup characteristics, data and consumer privacy regulations, regulatory knowledge and compliance, regulatory impact, labor, legal counsel, and patents. The survey also consists of two additional sets of questions—the first set designed for only medtech companies and the second set designed for only fintech companies.

2. TECHNOLOGY STARTUPS IN HIGHLY REGULATED INDUSTRIES

To understand how technology entrepreneurs perceive regulations, the online survey asked the following question: "Based on your experience and knowledge of the regulatory environment in other industries, do you believe your startup is operating in a highly regulated industry?" Figure 1 provides the results for this question, which had 421 respondents. Our findings indicate that about 70 percent of startup executives believe they are operating in a heavily or moderately regulated industry. Specifically, 41 percent believe they are operating in a heavily regulated industry, and 29 percent believe they are operating in a moderately regulated industry. About 24 percent of startup executives believe they are operating in a lightly regulated industry, and 6 percent believe they are operating in an ambiguously regulated industry or "legal gray area."

The perception of the extent of regulations in an industry matters for technology startups because it can influence the startup birth rates in the industry and startup failures and, by extension, business dynamism, innovation, and job creation. Several studies have found that higher levels of regulation impede business activity, firm entry, and employment.[9] More specifically, a recent study examined the relationship between industry-specific regulations and technology startup entry and exit (failure) rates in the United States and Canada among 20,000 young technology startups from 2012 to 2019.[10] Using the RegData dataset hosted by the Mercatus Center at George Mason University to capture the intensity of national-level industry regulations, the study finds that more-regulated industries may exhibit lower rates of entry among young technology startups and that more-regulated industries are associated with a greater likelihood of a technology startup closing. To the extent that technology startups are at the forefront of innovation and job creation in the US economy, this may cause some worry.

Fieldwork interviews with technology entrepreneurs also provide some context for how entrepreneurs perceive the influence of regulations. Take, for example, this statement by the cofounder and former CEO of an airspace service startup: "I wouldn't [run a startup] again in a heavily regulated industry."[11] This interviewee indicated that regulations make it difficult for a newly formed startup to operate and to make money in the airspace industry. As a result, this former CEO closed down the startup.

Other entrepreneurs discussed the influence of regulation in connection with raising funds. A cofounder and CEO of a biotech startup in San Diego explained, "With our tech comes many regulations as we are a class 3 medical device, which means our product must go through the premarket approval process. . . . The regulatory requirements and longer approval timeline means we have to raise more capital than others."[12] The interviewee discussed how the startup faces limited funding opportunities because a typical venture capital firm does not fund startups in the biotech industry. The interviewee described

9. Francesco Bripi, "The Role of Regulation on Entry: Evidence on the Italian Provinces," *World Bank Economic Review* 30, no. 2 (2014): 383–411; Lee Branstetter et al., "Do Entry Regulations Deter Entrepreneurship and Job Creation? Evidence from Recent Reforms in Portugal," *Economic Journal* 124 (June 2013): 805–32; Leora Klapper, Luc Laven, and Raghuram Rajan, "Entry Regulation as a Barrier to Entrepreneurship," *Journal of Financial Economics* 82 (2006): 591–629; Bailey and Thomas, "Regulating Away Completion."

10. Liya Palagashvili and Paola Suarez, "Technology Startups and Industry-Specific Regulations," Fraser Institute, 2020, https://www.fraserinstitute.org/sites/default/files/technology-startups-and-industry-specific-regulations.pdf.

11. Interview, December 7, 2017 (city and company name removed to ensure anonymity).

12. Interview, December 8, 2017, in San Diego (company name removed to ensure anonymity).

acquiring funding instead from specialized sources. A founder and CEO of a startup in another regulated industry (clean technology, or cleantech) described a similar situation: "We are a highly regulated market which means high risk and thus it is hard to get funding. . . . It is also complex regulations; it takes a lot of our time."[13]

Indeed, our online survey results also reveal a distinct difference in the types of funding sources between startups perceived to operate in heavily regulated industries and those perceived to operate in lightly or ambiguously regulated industries. Startups in heavily regulated industries are more likely to report the following pre-seed or seed funding sources: venture capital from industry-specific investors, universities, government grants, and strategic partnerships in the pre-seed funding stages; and private equity in the post-seed funding stages.

Most venture capital firms in the fieldwork interviews[14] also commented that they tend to "stay away" from the biotech and medtech industries or other companies that require many "regulatory hurdles":[15]

- "It takes forever to take a product to market that gets lots of regulatory hurdles; lots of clinical trials." "We stay away from those industries." (the founder and managing partner of an early-stage venture capital firm)[16]
- "Our policy: no health that has blood. AI yes. Non-blood healthcare companies, maybe. But no blood." Why? "Massive repercussions . . . [such as] big

13. Interview, December 8, 2017, San Diego (company name removed to ensure anonymity).
14. Most of the venture capital firms represented in our interviews were investing in seed or early-stage startups. We conducted interviews with partners or managing partners of the venture capital firms. The venture capital firms involved in our interviews were located in Austin, Texas; Boston; Denver; Los Angeles; New York City; and Silicon Valley.
15. Some venture capital interviewees drew a distinction between startups in highly regulated industries and startups in regulatory gray areas that may be prone to disruption. While these interviewees indicated that they stay away from the former, some indicated that the latter could be a "good investment opportunity." Additionally, some venture capitalists commented on the fact that, because they are unfamiliar with the complex regulations in those industries, they choose to stay away from them. This may explain why startups in highly regulated industries receive greater funding from industry-specific investors, who have greater experience with the regulated industry and can better assess and help medtech startups overcome the regulatory hurdles. It is also important to note that most of the venture capital firms in our interviews were investing in seed or early-stage startups. Only four of 12 firms included investment stages beyond early stage (these included growth, late stage, venture, and private equity). It may be the case that seed and early-stage investors tend to stay away from highly regulated industries, and thus our sample of mostly early-stage venture capital firms would not accurately represent the strategies of all venture capital firms. More empirical research is needed to understand whether our findings hold true for venture capital firms that provide investments at later stages.
16. Interview, December 13, 2017, Los Angeles (company name removed to ensure anonymity).

lawsuits we're afraid of." (the principal, and now partner, of an early-stage venture capital firm)[17]

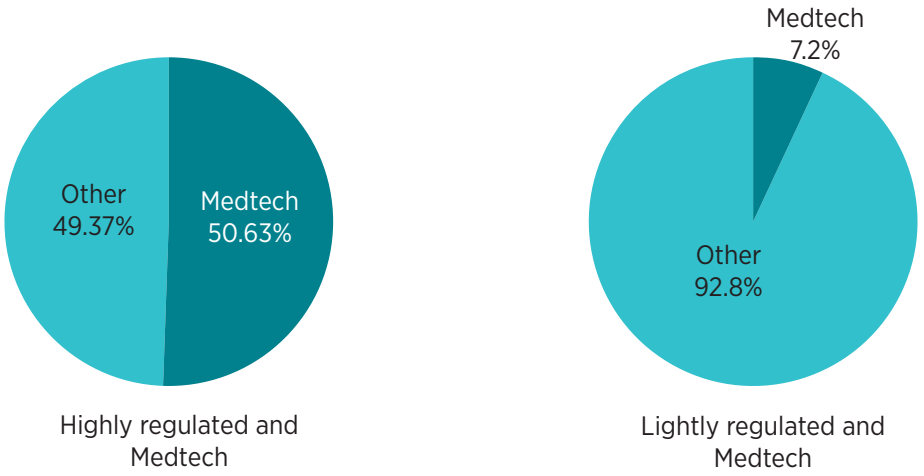
- "The ideal company can scale with not as much capital. . . . That typically means we stay away from highly regulated industries. . . . Regulations defeat this purpose; they add a layer of bureaucracy and add to the capital requirements. . . . That means we stay away from biotech. Cleantech also requires a lot of capital." (the founder and managing partner of an early-stage venture capital firm)[18]

Almost all technology startups rely on venture capital funding to enable them to grow from an early stage to late stages, and eventually to acquisitions or initial public offerings as an exit strategy.[19] A lack of funding (or running out of money) is often cited as one of the main reasons that startups fail.[20] Venture capitalists seek to invest in startups to get significant returns and get them as quickly as possible.[21] More specifically, the goal of venture funds is to achieve returns in the order of 20 percent or more per year within a 10-year period.[22] Because of this, venture capital firms are willing to finance companies that have shorter time horizons and greater capital efficiency. Since heavier regulation adds a layer of bureaucracy, increases capital requirements, and lengthens the time horizon of investment returns, startups in more-regulated industries could attract less venture capital funding.

The limited venture capital funding in highly regulated industries thus creates a second layer in how regulations can hinder startups: not only directly, but also indirectly because the struggle for fundraising and financing becomes even more of a burden for startups in regulated industries as compared to those in other industries. This means that heavier regulations do not always ensure that the safest and best products emerge in the marketplace. Instead, the regulatory environment creates challenges for all firms in these particular industries because of a lack of venture capital funding. In other words, even if a startup is

17. Interview, October 17, 2017, Silicon Valley (Palo Alto, California; company name removed to ensure anonymity).
18. Interview, December 14, 2017, Los Angeles (company name removed to ensure anonymity).
19. Paul Gompers and Josh Lerner, *The Venture Capital Cycle*, 2nd ed. (Cambridge, MA: MIT Press, 2004).
20. "The Top 20 Reasons Startups Fail," CB Insights, November 6, 2019, https://www.cbinsights.com/research/startup-failure-reasons-top/.
21. Joseph Ghalbouni and Dominique Rouziès, "The VC Shake Out," *Harvard Business Review*, July–August 2010; Andrew Hargadon and Martin Kenney, "Venture Capital and Clean Technology: Opportunities and Difficulties" (Berkeley Working Paper Series, University of California, Berkeley, 2011); Ali Kousari, "New Solutions to the Funding Dilemma of Technology Startups," *Technology Innovation Management Review*, June 2011.
22. Hargadon and Kenney, "Venture Capital and Clean Technology"; Raymond Niles, "Entrepreneurial Discovery Capital," *Journal of Economic Behavior and Organization* (forthcoming).

FIGURE 2. HEAVILY VS. LIGHTLY REGULATED INDUSTRIES AND MEDICAL-RELATED TECHNOLOGY STARTUPS



creating the safest medical product, this product may never reach the market because the startup faces limited funding owing to the nature of the regulatory environment within which it operates.

In contrast to medtech, cleantech, and fintech startup CEOs, software startup CEOs explicitly discussed how they did not face many industry regulations.[23] Take, for example, the following quotations of startup software executives:

- "To be honest . . . as an entrepreneur in the area of software, we have it easier than almost any other industry." (the founder and CEO of a business-to-consumer software startup, New York City)[24]
- "No aspect of our software is regulated. . . . We don't really have a lot of regulatory concerns." (the founder and CEO of a business-to-business software startup, Boston)[25]
- "We are in software. . . . It's just easy for us in terms of regulations." (the founder and CEO of a business-to-business software startup, Los Angeles)[26]

Findings from the online survey also indicate that of startups in moderately to highly regulated industries, 77 percent are in the medical-related technology space. Figure 2 highlights the contrast between the proportion of medical-related technologies in heavily regulated industries and the proportion in lightly

23. These are software startups that were also not connected to the financial or medical industries.
24. Interview, May 23, 2017 (company name removed to ensure anonymity).
25. Interview, September 22, 2017 (company name removed to ensure anonymity).
26. Interview, December 7, 2017 (company name removed to ensure anonymity).

regulated industries. Although medical-related technology startups compose only one-third of our sample, approximately 50 percent of the respondents who perceive they are in a heavily regulated industry are associated with medtech startups. Only 7.2 percent of respondents who perceive they are in a lightly regulated industry are associated with medtech startups.

In our fieldwork interviews, while many of the medtech interviewees discussed the challenges of FDA regulations, there was also a considerable amount of discussion (including specific stories) about how restrictions on data—specifically, medical data—were hindering medical startups and innovation. Of the 16 interviewees in the medical technology space, 8 of the interviewees (50 percent) discussed extensively the problems of patient data restrictions and, in particular, a lack of standards about access to patient data. These descriptive findings do not necessarily imply that there *should be* less medtech regulation; there is an argument that greater medtech regulation helps to provide safe products. Rather, these findings should be used to come to a more thorough understanding of the *cost* side of the equation when providing a full cost-benefit analysis of additional regulation on medical technology innovation.

3. TECHNOLOGY STARTUPS AND THE INFLUENCE OF FEDERAL OR INDUSTRY REGULATIONS

Beyond understanding the extent of the regulations that small startups face, the goal of our interviews was to understand more explicitly whether (and how) regulations are influencing business decisions. In the fieldwork interviews, 18 of 45 technology startup executives (40 percent) indicated that regulations directly influenced their decisions to alter their business models, products or services, or business direction.[27] But how exactly did startups change their business models or core products in response to regulations? The fieldwork interviews provide some context about how regulations are shaping and influencing business models and products. Each regulatory influence aspect was unique, and some had more profound influences than others. Some examples that follow give a sense of the ways in which executives described how regulations influenced their business models and core products.

27. To capture when startup executives discussed how regulations directly influenced their decisions to alter their business models, change their core products, or pivot the direction of their businesses, I coded each fieldwork interview with a "1" when this was discussed in the interviews. This also included instances when the executives attributed the specific creation of their products or services to regulation ("because of" regulations).

3.1 A Pivot Out of the Legal Industry

> "So the company started off as being a marketplace for legal advice and legal services. . . . But I'm exiting that particular business model and going to another one because there are so many regulations that prevent me from doing what I was trying to do. . . . We're now providing paralegal services because seemingly I can get around those things."
>
> —the founder and CEO of a legal technology startup[28]

This startup founder and CEO discussed several specific legal industry regulations. Some of these included the following: (a) attorneys cannot split fees with nonattorneys, which meant that the startup could not attempt to innovate in a particular way that would have helped lower the price of legal services for customers; (b) the startup could not receive payments for any referrals or recommendations, which meant that a particular aspect of its business model would not work;[29] and (c) the startup could not recommend lawyers and then market those lawyers, because the startup founder was not a licensed lawyer in the particular state in which the startup was operating (even though the lawyers working for the team were licensed). The startup founder and CEO described how, consequently, several attempts to innovate on different margins in the legal industry did not work. The startup pivoted into working with paralegals because there were fewer regulations.

3.2 From Payment Provider to Distribution Provider

> "We initially thought we would become a payment provider. . . . In our blissful ignorance as young founders [we] were like, 'Oh, this should be pretty straightforward.' And then after finding out that even just to do [automated clearing house] transfers in the United States in all 50 states it's like something like the legal costs after everything probably are close to $900,000. . . . So I think what we actually ultimately figured out was that if we are a distribution company of the content we do not have to have money transfer licenses and things like that. And so it is

28. Interview, May 30, 2017 (city and company name removed to ensure anonymity).
29. I am unable to provide further details on this aspect of the business model because it was confidential.

> our responsibility just to pay the royalties that we collect on the behalf of these respective parties."
>
> "So it's the payment processing was the thing that we thought we were going to build in-house, and we ultimately decided we need to go find a payment provider for that."
>
> —a cofounder and chief technical officer of a startup[30]

This startup founder added that once the company becomes a larger player in the field, it may consider going back to the original intent of also serving as a payment provider.

3.3 Avoiding the FDA Approval Process

> "First of all, our cofounders made a point that they don't want to have to be an FDA-approved app, just because of all the extra steps you have to put in to get to that level."
>
> —the COO of a digital health startup, Boston[31]

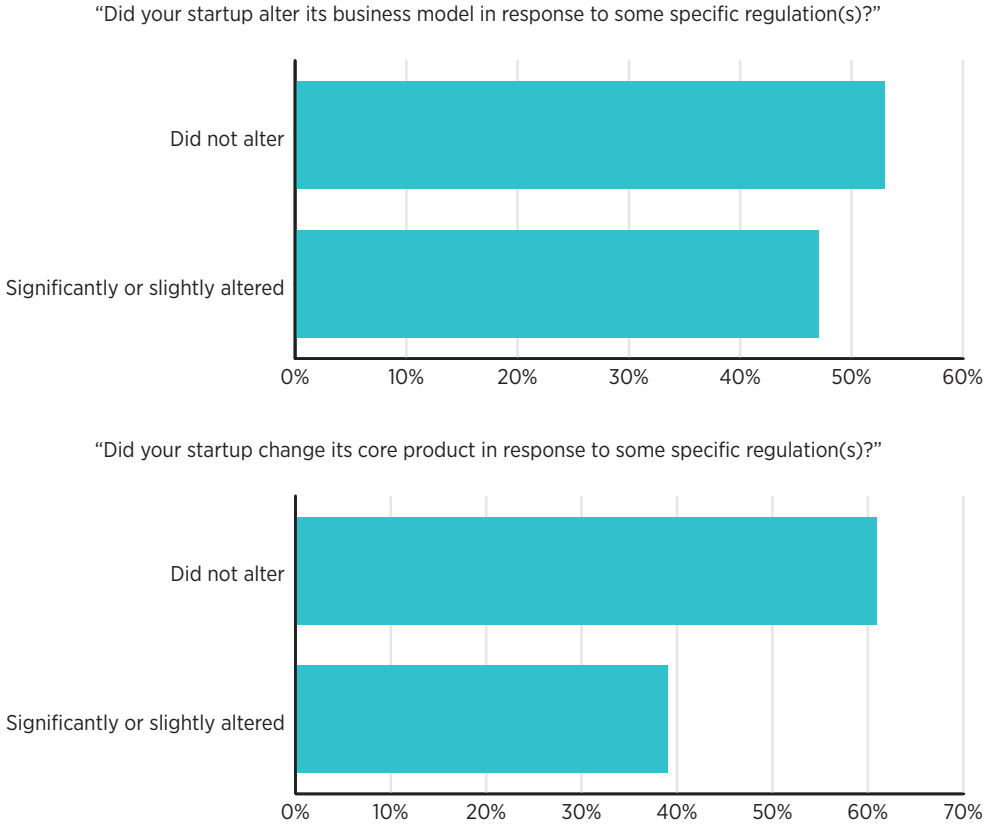
A Boston-based startup COO described how the company thought about building a particular product, but altered that product precisely because it wanted to avoid being a startup that would need FDA approval. The interviewee explained that this decision also meant the company could no longer work with hospitals, since hospitals need to work with the FDA-approved medical devices. The COO went on to describe how the process was going to be "way too long" and "very costly, and you think about, you know, bringing your law team and how many hours they devote to getting whatever approval you need. And it's just a headache. I mean you know you're trying to really focus on building your business and growing your company. So how do you deal with this other side?"

3.4 Evidence from the Online Survey

In addition to the fieldwork interviews, the online survey attempted to also capture the extent of regulatory influence. Figure 3 provides the results for the following survey questions, which had 428 respondents: "Did your startup alter its business model in response to some specific regulation(s)?" and "Did your

30. Interview, December 7, 2017 (city and company name removed to ensure anonymity).
31. Interview, September 21, 2017 (company name removed to ensure anonymity).

FIGURE 3. REGULATION'S INFLUENCE ON BUSINESS MODEL OR CORE PRODUCT



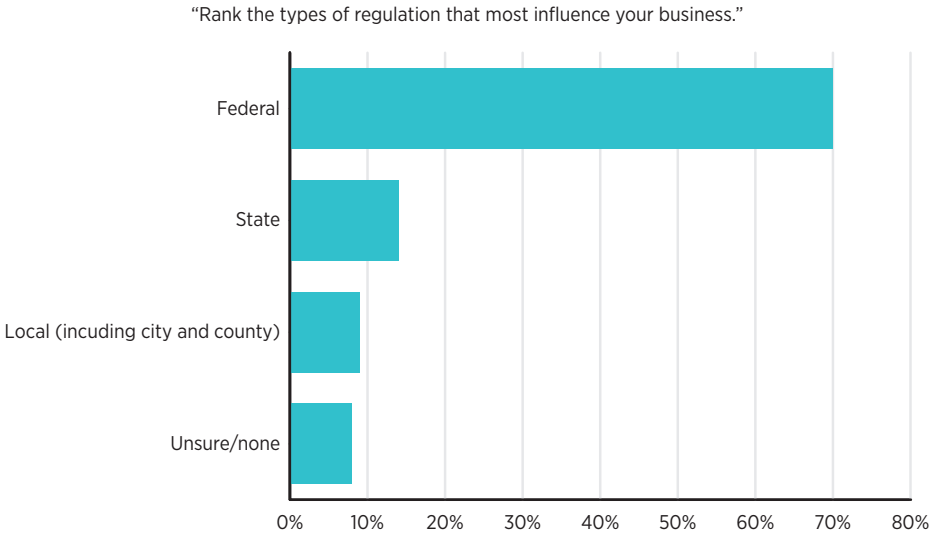
startup change its core product in response to some specific regulation(s)?" Approximately 47 percent of the technology startups in our sample indicated that regulations influenced their decisions to change their *business models*, and approximately 39 percent indicated that regulations influenced their decisions to change their *core product*.

Heavily regulated industries will likely have a greater influence on startup business models and products than will lightly regulated industries. Table 1 presents the breakdown of how startups in heavily, moderately, and lightly or ambiguously regulated industries answered the question about whether regulatory influence had a significant impact, a slight impact, or no impact on their business models and core products. The survey results show that very few startups in lightly regulated industries (4 percent) indicated that regulations had a *significant* impact on their business models or core products, while more of those in highly regulated industries indicated that regulations had a *significant* impact on their business models (22 percent) and on their core products (15 percent).

TABLE 1. REGULATORY INFLUENCE ON HEAVILY REGULATED, MODERATELY REGULATED, AND LIGHTLY OR AMBIGUOUSLY REGULATED INDUSTRIES

Altered Business Model			
In response to some specific regulation . . .	Heavily	Moderately	Lightly or ambiguously
Significantly altered business model	22.15	15.04	4.04
Slightly altered business model	27.22	42.48	33.33
No change in business model	50.63	42.48	62.63
Altered Core Product			
In response to some specific regulation . . .	Heavily	Moderately	Lightly or ambiguously
Significantly altered core product	14.46	13.27	4.04
Slightly altered core product	25.32	30.97	27.27
No change in core product	58.23	55.75	68.69

FIGURE 4. WHAT LEVEL OF GOVERNMENT REGULATION HAS THE MOST INFLUENCE ON STARTUPS



To get a sense of what level of government seems to be influencing startup business models and core products, we included the following question in the online survey: "Rank the types of regulation that most influence your business. Rank 1 = most influence." This question had 421 respondents. Figure 4 presents the results: Approximately 70 percent of startups believed that federal government regulations have the most influence on their business, followed by state regulations and then local regulations in third.

Taken together, the fieldwork interviews and online survey indicate that approximately 40 percent of technology startups said that government

regulations influenced their business models or core products and that the federal government regulations had the most influence. Startups in more heavily regulated industries as compared to lightly regulated industries said that government regulations significantly influenced their business models or core products. As noted earlier in this section, our fieldwork interviews revealed several unique ways in which this occurred: (a) a startup pivoted out of the legal industry because of regulations; (b) a group of founders intended to innovate in the payment provider space but, because of the legal costs, changed their business's direction to be a distribution provider; and (c) a digital health startup built its product in a way to avoid being regulated by the FDA because of the additional costs and time FDA approval would require.

These cases, along with several others discovered in our fieldwork interviews, seem to demonstrate how regulations are deterring at least some innovation in certain regulated spaces. This not to say that a company cannot attempt to disrupt these spaces but, rather, that some would-be innovation is not happening because of the restrictive nature of specific industry regulations.

4. TECHNOLOGY STARTUPS AND USE OF LEGAL COUNSEL

The role of lawyers (for nonincorporation purposes) for startups can provide some indication of a more objective way to understand the level and complexity of regulatory and legal issues facing technology startups. Of 412 startup respondents, almost all of them (92 percent) indicated that they have used outside legal counsel for purposes beyond incorporation, and a majority of them (64 percent) began using legal counsel within six months of incorporation (see figure 5).

To examine whether there is greater use of legal counsel in more regulated industries, table 2 reports the findings of use of legal counsel across lightly, moderately, and heavily regulated industries. Relative to startups perceived to operate in lightly or ambiguously regulated industries, those in heavily regulated industries are almost three times less likely to report having never used outside legal counsel for nonincorporation purposes.

Moreover, to get a sense of what type of regulations and legal issues matter, the online survey included the following question: "Rank up to 3 most important reasons why your company has required outside legal counsel post incorporation (i.e., hired a law firm for legal services). Rank 1 = most important."

This question had 377 respondents, and the results are presented in figure 6, panels A and B. Panel A shows that a large majority of startups—74 percent—selected *fundraising (i.e., angel, venture capital, private equity deals)* as one of the

FIGURE 5. USE OF LEGAL COUNSEL AMONG TECHNOLOGY STARTUPS

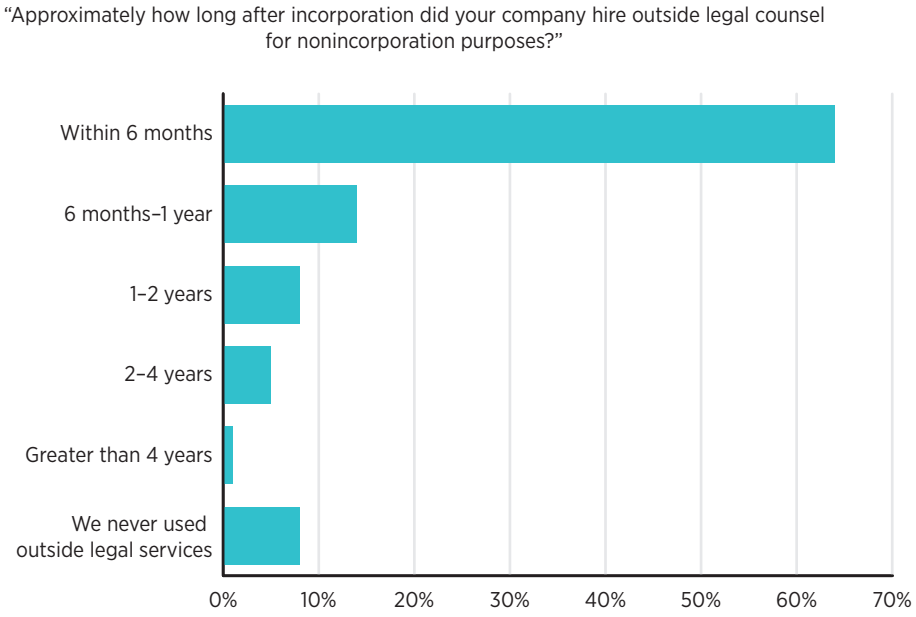


TABLE 2. USE OF LEGAL COUNSEL AND REGULATED INDUSTRY

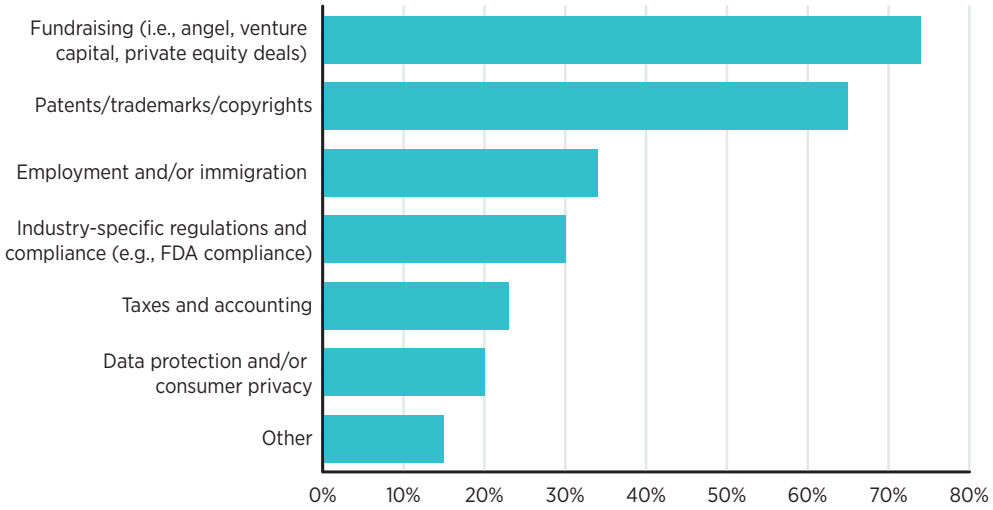
Never used outside legal counsel	Percentage
Heavily regulated	5.7
Moderately regulated	4.4
Lightly or ambiguously regulated	13.6

top three reasons that they started working with outside legal counsel. This is followed by *patents/trademarks/copyrights* (65 percent of startups) and *employment and/or immigration* (34 percent of startups). Panel B presents the results by the top reason selected for why startups chose to work with a legal counsel: 41 percent of startups selected fundraising deals as the top reason for why the company required outside legal counsel; 27 percent of startups selected intellectual property concerns (patents, trademarks, and copyright); and 16 percent of startups selected industry-specific regulations and compliance.

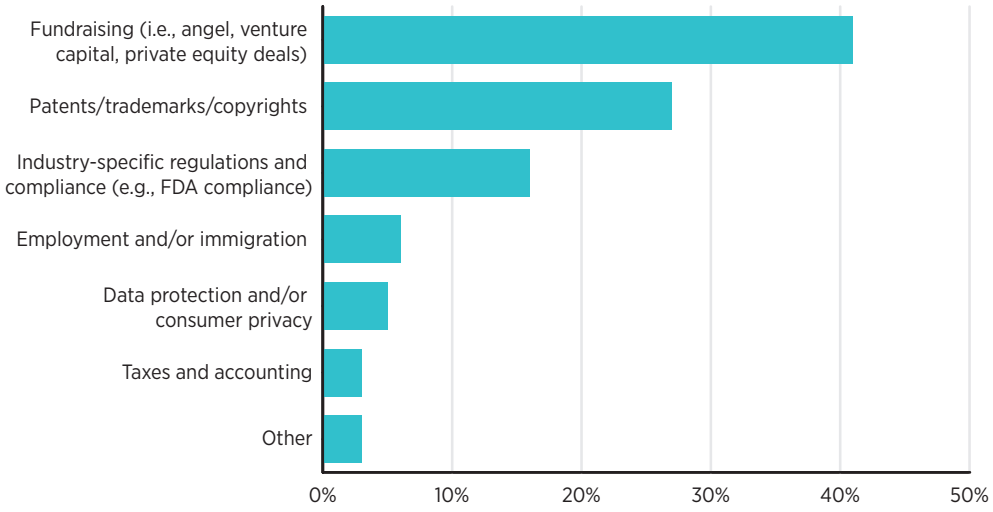
The findings show that regulations in funding and regulations in intellectual property are the most important reasons for working with lawyers post-incorporation. Indeed, an entire literature exists on the Securities and Exchange Commission and the extensive and costly regulatory processes to invest in private companies.

FIGURE 6. PURPOSES FOR LEGAL COUNSEL

Panel A: Top Reasons (No. 1, No. 2, and No. 3) Why Company Chose to Work with Outside Legal Counsel



Panel B: No. 1 Reason Why Company Chose to Work with Outside Legal Counsel



Moreover, some research on intellectual property also complements our survey findings.[32] Patents, for example, are most important for medtech companies. Half of the startups in our sample did not own patents. The mean number of patents for startups in medtech is 4.85, while the mean number of patents for

32. For an overview of this work, see Gerald B. Halt Jr. et al., *Intellectual Property and Financing Strategies for Technology Startups* (New York: Springer International, 2017).

our full sample of startups is 2.90. Moreover, the mean number of patents owned is double for startups in heavily regulated industries (4.15) compared to that for startups in lightly regulated industries (2.04)—and this seems to be driven by the overrepresentation of medtech startups in heavily regulated industries.

The topic of requiring legal counsel for patents was also discussed in a number of our fieldwork interviews. A Los Angeles–based cleantech startup CEO, who is also a scientist, said that obtaining a patent in that industry is a "barrier to entry for any entrepreneur."[33] The executive explained that a single provisional patent for the startup cost roughly $3,000 to write and then $5,000 to get issued. When the interviewer asked whether the patent was necessary to operate the startup, the CEO responded that the business would have been fine without obtaining a patent and that patents are "kind of pointless" and "only good for VCs [venture capitalists] and investors."

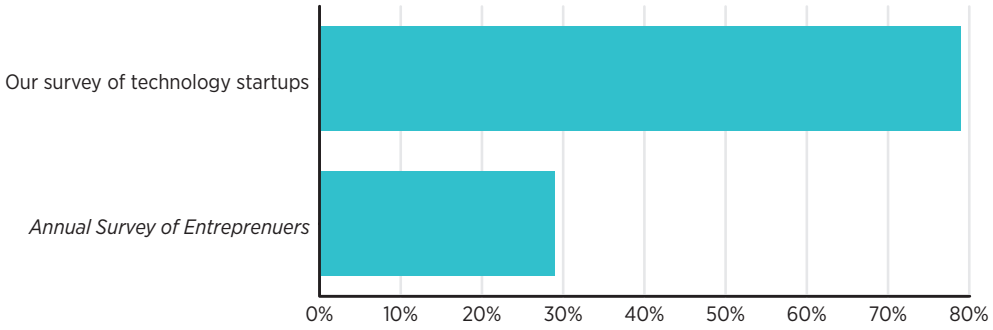
Another startup CEO (of a business-to-business software startup) provided a similar take on patents as unnecessary, explaining that patents are "one of the worst barriers to entry [into the startup environment] because they have all the things entrepreneurs hate."[34] The executive explained that the things entrepreneurs hate are the high cost of acquiring a patent and the high risk associated with trying to defend a patent. However, the executive continued, "investors love you to have patents because it is a hedge for them against your failure."

As in the online survey, in the fieldwork interviews entrepreneurs involved in tech startups also indicated that they use lawyers for fundraising deals. I also tallied all the fieldwork interviews where startup respondents indicated an extensive use of lawyers or high legal costs in general. In the fieldwork interviews, 27 out of 45 startups (60 percent) indicated that they have used lawyers to a great extent. For example, one biotech company based in Silicon Valley estimated that costs to lawyers alone make up roughly 10 percent of total operations costs.[35] The interviewee explained that the startup would like to hire in-house legal counsel but cannot afford it. Instead, the startup juggles lawyers on the basis of their specialties. The interviewee indicated that legal fees are never less than $350 per hour and average between $400 and $650 per hour, but can rise to $1,000–$1,200 per hour for litigation.

The extent to which lawyers are used provides some indication of a more objective way to understand regulatory impact. If regulations on startups are minimal or are not complex, we would not expect extensive use of lawyers for

33. Interview, December 5, 2017 (company name removed to ensure anonymity).
34. Interview, May 23, 2017, New York City (company name removed to ensure anonymity).
35. Interview, October 18, 2017 (company name removed to ensure anonymity).

FIGURE 7. USE OF CONTRACTORS REPORTED IN ONLINE SURVEY OF TECHNOLOGY STARTUPS VERSUS IN THE US CENSUS BUREAU'S *ANNUAL SURVEY OF ENTREPRENEURS*



Source: US Census Bureau, *Annual Survey of Entrepreneurs*, 2016, https://www.census.gov/programs-surveys/ase.html.

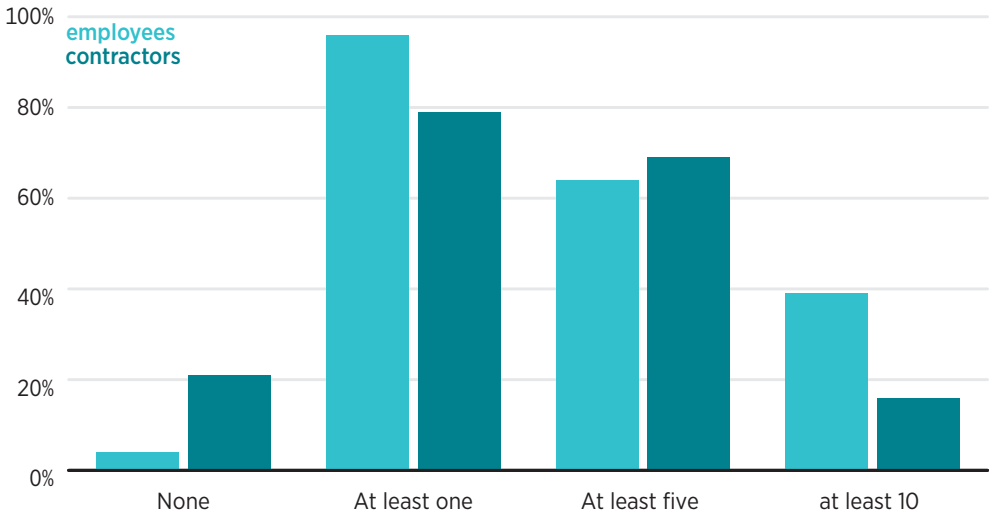
regulatory matters. Taken together, our results seem to indicate that most startups do need to use legal counsel immediately (within six months) and that the main purposes of such counsel are for help navigating regulations in funding and in intellectual property. Perhaps one reason that industry-specific regulations are ranked after funding and intellectual property is that *all* startups must deal with regulations in funding and intellectual property, but only startups in highly regulated industries (such as medtech) must deal with industry-specific regulations.

5. TECHNOLOGY STARTUPS AND THE NEED FOR CONTRACT LABOR

What are the hiring practices of startups, and to what extent do labor regulations influence these hiring practices? The online survey asked respondents to provide information on the number of contractors and employees their startup hired (remote, part-time, and full-time). This question had 419 respondents. Figure 7 shows that 79 percent of the startups in the sample indicated that they use contract labor. To provide robustness to the findings in the online survey, I also checked through our fieldwork interviews (45 startups) and found that approximately 71 percent of these interviewees also indicated that their startups use at least one contractor. Compare this number to a "typical" US company from the US Census Bureau's *Annual Survey of Entrepreneurs*, which indicates that only 29 percent of companies hire any contractors.[36]

36. US Census Bureau, *Annual Survey of Entrepreneurs*, 2016, https://www.census.gov/programs-surveys/ase.html.

FIGURE 8. USE OF EMPLOYEES AND CONTRACTORS IN STARTUPS



Comparing the number of contractors and employees among startups in our sample reveals that almost all startups have at least one employee[37] and 79 percent of startups have at least one contractor (figure 8). Most startups indicated that they have both at least five employees (69 percent) and at least five contractors (64 percent). Only about one-third of the startups in our sample had at least 10 employees, and 16 percent had at least at 10 contractors.

Figure 9 shows the results from 331 respondents for a follow-up question on the use of contractors: "How important is the use of 1099 contractors for your specific business model?" Of the startups that used contractor labor, 57 percent indicated that the use of contractor labor is an indispensable or essential part of their business models; 39 percent indicated that it is not essential but is valuable; and only 4 percent indicated that the use of contract labor is not essential and is unimportant.

Our online survey also asked respondents who indicated that their startup uses contractor labor to rank up to three main reasons *why* it uses contractor labor. This question had 330 respondents, and figure 10 reports the results. The top reasons are

1. startups needed individuals for one-off projects or they needed specialized talent they could not hire full time (69 percent);
2. startups needed flexibility, given the risk associated with early-stage development (60 percent); and

37. Founders are included in the employee count.

FIGURE 9. IMPORTANCE OF USING 1099 CONTRACTORS FOR SPECIFIC BUSINESS MODEL

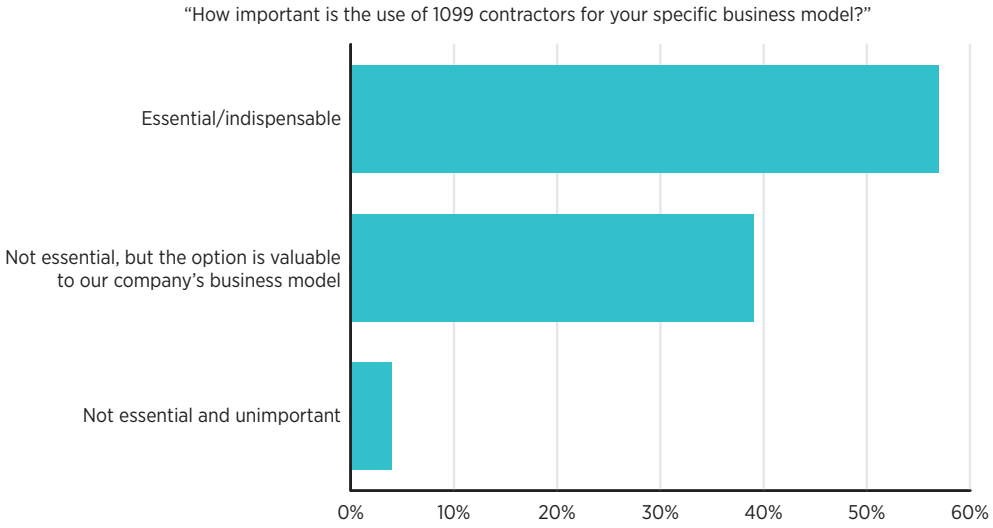
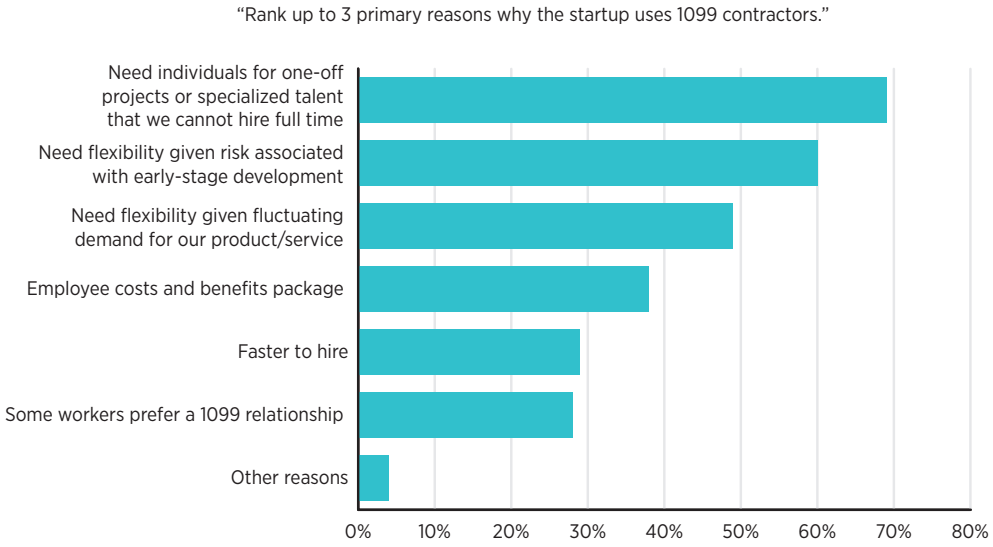


FIGURE 10. PRIMARY REASONS WHY STARTUPS USE 1099 CONTRACTORS



3. startups needed flexibility, given fluctuating demand for their product or service (49 percent).

In the fieldwork interviews, the use of contractor labor was extensively discussed, and this discussion can provide context on the importance of contract labor for startups:

- "Contractors are nice for me right now because I'm currently in a somewhat precarious situation financially. We're like roughly profitable, but if something stops working, I'm going to have to quickly let people go." (the founder and CEO of a software startup, New York City)[38]
- "Onboarding an employee is more of a commitment. And at this stage this company is at, I need to be a little more agile. . . . Bringing on employees is more of cumbersome. . . . With a company this size, cash burn rate is like what I'm most concerned about. . . . I need to make sure that I keep expenses down as much as possible." (the founder and CEO of a software startup, Boston)[39]
- Hiring contractors offers an "opportunity to make mistakes on hiring. And so you 1099. OK. I'll get him in, I'll see how they do, if they're not working out, I'll let them go. Allows for a little bit of a failure mode for a hiring process. As opposed to, 'I need to hire the best and brightest under three minutes that I need to.'" (the founder and former CEO of a software startup, Silicon Valley)[40]

Implicit in some of these responses for why startups prefer to use contractor labor over employee labor is the assumption that, during unpredictable times when startups are trying to find their market and build their product, they need to be able to hire and fire easily and cannot commit to the additional costs associated with hiring employees. Some executives explicitly discussed employment and labor laws as a hindrance to their ability to be flexible in the early stages of a startup, and thus the reason they turn to contractors:

- "I then recognized in California how you actually have significantly less rights to simply fire somebody. And you have to be very careful about like documenting exactly your warnings to them about their job performance, giving them multiple warnings that are concrete, measurable and that they can respond to by metrics, and then going through a stage to let them go. . . . There's just a lot more headache that goes into firing someone you want to fire, in California, than there is elsewhere. . . . [It means] I'm slower to hire, and also more likely to 1099 people until you know they're going to work out." (the founder and CEO of a fintech startup, Silicon Valley)[41]

38. Interview, May 30, 2017 (company name removed to ensure anonymity).
39. Interview, September 22, 2017 (company name removed to ensure anonymity).
40. Interview, June 22, 2017 (company name removed to ensure anonymity).
41. Interview, June 20, 2017 (company name removed to ensure anonymity).

- "We've been using contractors for the past two years. . . . All the extra stuff is very expensive [in California]. . . . There's a lot of labor laws. And then you can get sued." (the founder and CEO of a fintech startup, Los Angeles)[42]
- "I had, at one point, five employees working . . . and, you know, you have to get workers' comp insurance, healthcare insurance. Even after I got rid of my employees, I was getting hit with like $10,000 fines every quarter for not having workers' compensation insurance. . . . Now I'm like almost resolved to never hire a New York City employee." (the founder and CEO of a legal technology startup that now works with contractors only, New York City)[43]

This sentiment was also expressed by a venture capitalist who invests primarily in early-stage startups. This venture capitalist remarked that California's high costs of labor and employment regulation "encourage distributed teams," which tend to include contractors rather than employees of a company.[44]

Overall, the results from the online survey and the fieldwork interviews indicate that startups overwhelmingly use contractor labor. They do this because, in their early stages, startups require flexibility and face limited funding and uncertainty that preclude commitment to employees. Some of these reasons are embedded in the policy environment for labor: CEOs indicate that because of the regulations (especially in California), startups use contractors to give them the flexibility they need to hire and fire. It is important to note that almost no startup representatives in the fieldwork interviews discussed problems with labor regulations such as minimum wage laws or overtime regulations. This is likely because many labor regulations focus primarily on low-skilled labor, and technology startups hire primarily high-skilled labor.[45] Thus, while regulations on low-skilled labor such as minimum wage and overtime requirements may be more important for mom-and-pop shops than for technology startups, regulations on contract labor may be more important for small technology startups because these businesses use contract labor to a greater extent (79 percent) than does a typical small business (29 percent).

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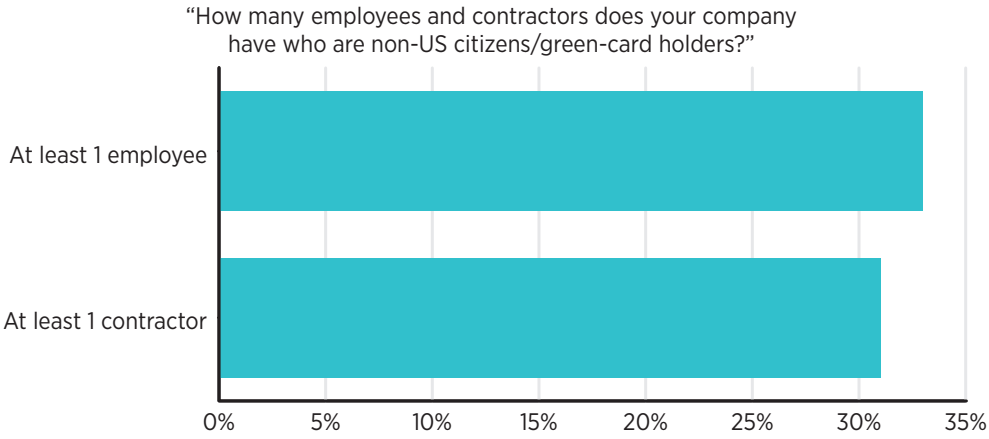
42. Interview, December 6, 2017 (company name removed to ensure anonymity).
43. Interview, May 30, 2017 (company name removed to ensure anonymity).
44. Interview with the founder and managing director of an early-stage venture capital firm, December 14, 2017, Los Angeles.
45. Liya Palagashvili, "Silicon Valley vs. Main Street: Regulatory Impact on Entrepreneurial Ventures," in *Entrepreneurship and the Market Process*, ed. Arielle John and Diana W. Thomas (Cham, Switzerland: Palgrave Macmillan, 2021), 171–201.

FIGURE 11. STARTUPS HIRING EMPLOYEES AND CONTRACTORS WHO ARE NOT US CITIZENS OR GREEN CARD HOLDERS



6. TECHNOLOGY STARTUPS AND THE NEED FOR HIGH-SKILLED FOREIGN WORKERS

In addition to reporting the number of employees and contractors in the online survey, technology startup executives were asked to report the number of employees and contractors that they hire who are not US citizens or green card holders. This question had 415 respondents. Figure 11 shows that about one-third of technology startups in our sample hire employees or contractors who are not US citizens or green card holders (hereafter "foreign workers").

For those who did not currently hire foreign workers as employees, a follow-up question was asked: "Is a primary reason you do not employ a non-US citizen/green-card holder due to the process of obtaining a visa?" About one-third of respondents answered yes.

Moreover, the online survey also asked respondents whether they have *ever* hired foreign workers as contractors, and through a series of follow-up questions the survey directly asked about a potential substitution effect between international employees and international contractors: "Was a primary reason you did not hire an individual contractor as an employee related to the process of obtaining a visa?" Approximately 70 percent of startup executives answered yes to this question, implying that high-skilled foreign contractors are being used as substitutes for high-skilled foreign employees whom companies could not hire in the United States owing to the visa process.

The interviews also complement this discussion. The final interview question asked of all interviewees was what public policies, if any, they would change

to better help their startups grow and succeed. This was an open-ended question, and the most common answer across interviews was to loosen restrictions on their ability to hire high-skilled foreign workers. In fact, more than one-third of interviewees directly said that this was the biggest challenge for their startups. Several technology startups also specifically mentioned easing the H-1B visa process to make it more accessible for startups seeking to obtain visas for the international workers they require.

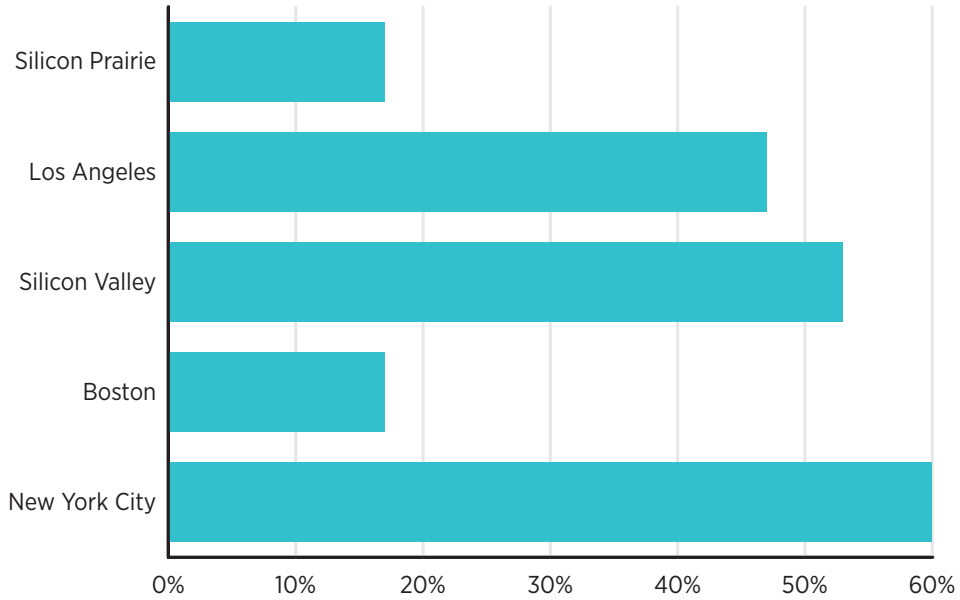
When the team inquired further, most respondents explained that they need either software developer talent or highly specialized technical talent that they struggle to find among US workers.[46] Some interviewees indicated that they would *prefer* to hire US workers (also because it would be easier to hire them), but that they cannot find the right talent in the time they have to fill the position.

What do the startups in the interviews indicate that they do instead? Almost all the interviewees who faced these challenges instead hired high-skilled foreign workers as contractors. Most of these workers are software developers or other highly specialized technical workers based in Belarus, Ukraine, or the Baltic states (Lithuania, Latvia, and Estonia). Contracting with high-skilled foreign workers is significantly inferior to employing them, but respondents indicated that it is their best option for survival when they face limited US talent and policy or legal challenges to hiring the foreign workers as employees:

- "What I'd like working through foreign labor market is to be able to, like, press a button and say, 'we want you to come work for us, and here's your H-1B visa.' Because, especially as a startup, when you need talent, you can't leave a position unfilled for six months. We need talent filled, like not even next week, but today. And there's no way that works in the current system, not even remotely." (the founder and CEO of a business-to-business software startup, New York City)[47]
- "We need a specialized skillset. . . . Very complex things, complex data, complex architectures, complex code. . . . I would like to see immigration being eased . . . [to provide] just a little more breathing room." (a cofounder and COO of a software startup, New York City)[48]

46. This is consistent with the results of the online survey, in which 77.8 percent of startup executives indicated that developers and engineers were the roles for which they faced the greatest hiring challenges.
47. Interview, May 23, 2017.
48. Interview, June 12, 2017.

FIGURE 12. HIRING CHALLENGES BY LOCATION



Note: "Silicon Valley" includes San Francisco and neighboring cities. "Silicon Prairie" includes Austin, Texas; Chicago, Illinois; Omaha, Nebraska, Pittsburgh, Pennsylvania; Denver, Colorado; and Boulder, Colorado.

- "It's very difficult for us to hire people overseas who we need. . . . There definitely needs to be fewer regulations [on that]." (the founder and CEO of a business-to-business software startup, San Diego)[49]

It is important to emphasize that the discussions about access to high-skilled foreign workers were not in the context of foreign workers *necessarily* being superior to US workers. These discussions were mostly in the context of facing limited options in the United States; requiring a particular skillset that was not readily available in the US market; or requiring a particular individual, needed for the team, who happened to be outside the United States.

However, the challenges regarding access to foreign talent were different across US cities. Figure 12 provides a breakdown of the US cities where fieldwork interviewees specifically indicated their hiring challenges and wanted greater access to the global market. Boston and the "Silicon Prairie" cities do not seem to have as many experiences with this problem as New York City, Silicon Valley, and Los Angeles. Indeed, some interviewees in Boston emphasized that Boston had a great pool of talent and they did not face many problems with finding the right software developer talent. This is likely a result of a mismatch between

49. Interview, June 26, 2017.

labor demand and labor supply in each particular city. Silicon Valley has almost 20 percent of US startups and thus has a greater labor demand for software developers.[50] Boston has less than 5 percent of US startups[51] and also has several technology-based universities that can readily produce software developers. So startups in the Boston area may not need to look to the global market for the talent they require.

The topic of access to high-skilled foreign workers for technology-related roles is vast. Many studies indicate that greater access to H-1B visas increases innovation.[52] In one study of technology startups in particular, Dimmock, Huang, and Weisbenner find that US technology startups that win (by lottery) more H-1B visa acceptances to hire foreign skilled workers are more likely to have a successful exit via an initial public offering or acquisition, as compared to companies that have lower "win rates" for their workers' H-1B visa applications.[53] Moreover, startups with greater H-1B visa acceptances are more likely to receive external financing during the next three years than startups that are not as successful in obtaining H-1B visas for their foreign high-skilled workers. Startups with greater H-1B visa acceptances also have more patent filings—indicating, again, an increase in innovation for the company. The researchers conclude that "the findings that a higher win rate in H-1B visa lotteries leads to improved funding and patenting outcomes of start-up firms suggest that foreign workers do not simply displace domestic U.S. workers at start-up firms, but rather bring valuable human capital that is otherwise difficult for these firms to obtain."[54]

Our survey results and fieldwork interviews complement the findings of the study by Dimmock, Huang, and Weisbenner by highlighting the challenges that startups face in hiring the talent they need, especially software developer talent. Some startups directly asked that access to the international market be eased in order to allow them to grow and succeed as companies.

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50. Data on the number of startups by location can be found in Palagashvili and Suarez, "Technology Startups and Industry-Specific Regulations."
51. Palagashvili and Suarez, "Technology Startups and Industry-Specific Regulations."
52. Giovanni Peri, Kevin Shih, and Chad Sparber, "STEM Workers, H-1B Visas, and Productivity in US Cities," *Journal of Labor Economics* 33, no. S1 (2015): S225–S255; Jennifer Hunt and Marjolaine Gauthier-Loiselle, "How Much Does Immigration Boost Innovation?," *American Economic Journal: Macroeconomics* 2, no. 2 (2010): 31–56; William R. Kerr and William F. Lincoln, "The Supply Side of Innovation: H-1B Visa Reforms and U.S. Ethnic Invention," *Journal of Labor Economics* 28, no. 3 (2010): 473–508; Sari Pekkala Kerr, William R. Kerr, and William F. Lincoln, "Skilled Immigration and the Employment Structures of US Firms," *Journal of Labor Economics* 33, no. S1 (2015): S147–S186.
53. Stephen G. Dimmock, Jiekun Huang, and Scott J. Weisbenner, "Give Me Your Tired, Your Poor, Your High-Skilled Labor: H-1B Lottery Outcomes and Entrepreneurial Success" (NBER Working Paper No. 26392, National Bureau of Economic Research, Cambridge, MA, October 2019).
54. Dimmock, Huang, and Weisbenner, "Give Me Your Tired," 6.

7. CONCLUSION

The descriptive findings discussed in this paper have some inherent challenges and limitations. First, there was the small sample size: combining the online survey and the fieldwork interviews, my team worked with a sample of just over 500 individuals. A more ideal (and still obtainable) target would have at least 2,000 respondents. Second, like most surveys, there is a sample selection bias in the types of individuals who respond to the survey. For example, it may be the case that the technology executives who responded to the survey were more likely to be those who were already in more heavily regulated industries—and thus had a greater interest in participating in a survey on regulations than technology executives who were in more lightly regulated industries. Third, respondents may not have provided accurate answers or may have had problems interpreting the questions. While I acknowledge these challenges and understand the limits involved in generalizing these results to all technology startups, I hope that our novel data collection will jump-start further research questions that examine young, innovation-driven technology startups and the influence of regulation.

Nonetheless, I can draw, with caution, some preliminary results from our findings. First, the ways regulations impact businesses take many forms. One of the main strands of literature on regulation and entrepreneurship focuses on the regulation of entry and the barriers to entry for entrepreneurs. Barriers to entry can be in the form of licenses and fees needed to start a business or other types of barriers and high costs of compliance. The startups in our samples do not appear to face such barriers to entry. No startup executives in our interviews explicitly discussed problems with starting the business or high costs of starting the business (in terms of fees, time, or procedures). This seems to accord with the fact that the United States ranks fairly well on the components of regulation of business entry in the World Bank's *Doing Business* index.[55]

However, some of the preliminary findings here do point to another aspect of the impact of regulations on business entry—startups may be attempting to enter and "disrupt" more heavily regulated industries but are being pushed back by regulations. Although it may be no surprise that these regulations are influencing startups, the importance of the findings in this paper reflect the extent to which regulations are influencing business directions—recall the stories from the fieldwork interviews highlighted in this paper. Thus, more-regulated industries may have fewer technology startups and potentially "less innovation" in

55. "Ease of Doing Business Rankings," World Bank, *Doing Business 2020* website, accessed February 27, 2021, https://www.doingbusiness.org/en/rankings.

their space because startups are pivoting into other industries or subindustries (as was the case with the startup CEO in legal tech who pivoted into the paralegal industry).

Since researchers usually focus on startup exits and deaths, one question that is overlooked is how startups are changing the nature of the products, their business models, and the margins of innovation because of regulations. Moreover, there are other indirect ways that regulation may be harming startups. For example, the interviews with venture capital personnel indicated that they tend to steer clear of startups in "very" regulated industries (though not startups in regulatory gray areas). One of the biggest challenges faced by all startups is acquiring funding from investors. Thus, startups in more heavily regulated industries are also facing another barrier: an indirect impact of regulations on their ability to grow and succeed.

There is a foundational debate about regulation: Do regulations exist for the public interest (to ensure healthier and safer products), do they exist for special interests (to deter entry of competitors), or are they prone to regulatory capture—meaning they start by promoting the public interest but end up promoting special interests? Although this paper does not aim to provide an answer, it does highlight the costs and consequences of regulation for greater innovation and economic activity. For example, the descriptive findings herein make it clear that in some cases, greater regulation deters more startup innovation and activity, especially in areas where innovation can provide, arguably, the greatest benefits—for instance, in the medical innovation space. These are important considerations to understand when an analyst is providing a full cost-benefit analysis of a regulation.

Moreover, in addition to the findings about the extent of regulations in the medtech industry, this paper also highlights the importance of labor regulations for startups—but in somewhat different ways than for a typical small business. For example, minimum wage laws, overtime regulations, and many other labor regulations that focus primarily on low-skilled labor were not mentioned in any interviews. This is because technology startups are primarily hiring high-skilled labor. Instead, the labor regulations discussed included much-needed flexibility in hiring and firing workers given the high-pace nature and business uncertainty of technology startups. Thus, a primary concern for startups in terms of labor is regulations regarding contract labor.

Last, many quantitative academic studies have shown the importance of access to foreign high-skilled labor for innovation in the United States. Our survey and fieldwork results are complementary to this research and provide the

direct perspective of technology entrepreneurs. In response to an open-ended question, more than one-third of entrepreneurs explicitly stated that restrictions on hiring from the international market was the biggest challenge for their startups' ability to grow and succeed.

Overall, this research paper provided the results of my team's data collection efforts to aid understanding about how policies and regulations are influencing technology entrepreneurship, which regulations matter most and at what level of government, and how different policies are changing margins of innovation or job creation. These factors are important to explore because a better policy environment for technology entrepreneurs can unleash greater innovation and job creation in our economy.

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ACKNOWLEDGMENTS

The original data collection for this paper was carried out at the Classical Liberal Institute at New York University School of Law, where co–principal investigators Richard Epstein, Liya Palagashvili, and Seth Oranburg received a grant from the John Templeton Foundation. Therefore, this paper was made possible through the support of a grant from the John Templeton Foundation. The opinions expressed in this publication are those of the author and do not necessarily reflect the views of the John Templeton Foundation. See "Startup Innovation: The Role of Regulation in Entrepreneurship," John Templeton Foundation, accessed December 15, 2020, https://www.templeton.org/grant/startup-innovation-the-role-of-regulation-in-entrepreneurship.

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