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The Gender Gap in Startup Catalyst Organizations: Bridging the Divide Between Narrative and Reality

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The startup industry has matured rapidly over the past decade, becoming a subject of substantial interest to the business community, academics, and the general public alike. Yet, the organizations that have sprouted up around the startup industry—dedicated to supporting the growth of fledgling ventures—have received less attention. Divided roughly into the three categories: co-working spaces, incubators, and accelerators. These support organizations all aim to “catalyze” the success of new startups. Thus, the authors have coined the term “Catalyst” to refer to them collectively. The present study used a qualitative interview method to obtain a more comprehensive picture of how Catalysts have impacted the entrepreneurial ecosystem. In particular, the study found a discrepancy between the narrative propagated by Catalyst personnel and the actual data when it came to the issue of gender. While respondents described a collaborative, open environment cultivated by Catalysts that should be particularly advantageous to women, the study found that the stark gender disparity observed in the startup and technology realms in general was maintained in the Catalyst microcosm. The authors speculate as to possible reasons behind this disconnect between narrative and reality, and suggest policy approaches for alleviating the gender gap in the Catalyst participant population.

I

THE CATALYST PHENOMENON: FUNCTION AND TYPOLOGY

Over the past decade, the success of companies like Facebook and Airbnb, accompanied by the birth of innovation hubs such as Silicon Valley, has dramatically increased the appeal of starting one’s own business venture. The Global Entrepreneurship Monitor (GEM), an annual study sponsored by Babson College and Baruch College, found that in 2014, a record high of 27 million working-age Americans, or nearly fourteen percent of the population, started or were running new businesses.¹ Though there was a slight abeyance of startup activity in the aftermath of the Great Recession in the late

¹ DONNA J. KELLEY ET AL., 2014 UNITED STATES REPORT: GLOBAL ENTREPRENEURSHIP MONITOR 7 (2014), <http://www.babson.edu/Academics/centers/blank-center/global-research/gem/Documents/GEM%20USA%202014.pdf>.

2000s, the industry has undergone a revitalization in recent years.² For example, in 2015, the Kauffman Startup Activity Index—an indicator of new business creation in the United States—experienced its largest year-over-year increase in two decades.³

Accompanying this rapid expansion of startup activity has been the birth of a new service market, designed to facilitate the success of fledgling entrepreneurial ventures. Such organizations capitalize on the hypercompetitive nature of the startup world by offering an extensive set of resources to startups—ranging from physical working space to a legion of experienced, readily-available mentors, to free services. Traditionally, the literature distinguishes between three broad categories of startup support organizations: co-working spaces, incubators, and accelerators. These three models differ in the scope of services offered, as well as their overarching philosophy toward supporting participant startups. Generally, however, they all aim to stimulate the growth of startups and “catalyze” their success. As such, throughout this paper, these organizations will be referred to collectively as “Catalysts.” In addition, although the terms co-working space, incubator, and accelerator are often used interchangeably in the general discourse on startups, a body of literature has taken shape which aims to more clearly distinguish between the three terms. Thus, definitions for each of these three types of Catalysts are set forth below.

A. Co-Working Spaces

Co-working spaces are organizations that host companies and freelance contract workers on a paid rental basis, while providing common business services such as reception, mail handling, and printing.⁴ This business model is often referred to as “real estate play” or “hot-desking.”⁵ One can conceptualize a co-working space as an

² ROBERT W. FAIRLIE ET AL., *THE KAUFFMAN INDEX: STARTUP ACTIVITY 9* (2015), http://www.kauffman.org/~media/kauffman_org/research%20reports%20and%20covers/2015/05/kauffman_index_startup_activity_national_trends_2015.pdf.

³ *Id.*

⁴ For the purpose of this Article, the authors use this term to refer only to spaces designated for entrepreneurs and startups, as opposed to those used by professionals in other industries.

⁵ See Meg Graham, *WeWork Bringing its Model of Larger Coworking Spaces to Chicago*, CHI. TRIB. (Apr. 27, 2015), <http://www.chicagotribune.com/bluesky/originals/chi-wework-chicago-coworking-bsi-20150424-story.html> (discussing the co-working space company, WeWork, and their prescience in recognizing large-scale co-working

intermediary between the highly-integrated, somewhat regimented workplace of a traditional company and the independent, often isolated life of a freelancer or early entrepreneur.⁶ A qualitative study of hundreds of co-working space participants found that interviewees valued such spaces for providing a communal feel, while allowing them to come-and-go at will and generally maintain their job autonomy.⁷

By virtue of their passive approach to catalyzing startup ventures, co-working spaces can be considered the most rudimentary, no-frills form of Catalyst. Though they lack the organized structure and extensive educational offerings of incubators and accelerators, co-working spaces provide the basic physical infrastructure necessary to run a business, as well as opportunities for organic network formation. Startups in their earliest stages often have neither the need for nor the capital necessary to rent out a conventional office. Co-working spaces provide access to all the features of a conventional office at a much more affordable price. In addition, they generally offer daily or monthly rates, which allow dynamic startups to escape long, binding rental contracts.⁸ Moreover, co-working spaces give startup founders the opportunity to be surrounded by like-minded individuals and teams, building up a valuable network of fellow entrepreneurs who can serve informally as sources of advice or tangible resources. Finally, one should not underestimate the human factor—that is, the psychological benefit of companionship—in the appeal of co-working spaces. A study of co-working spaces with over 600 participants found that eighty-five percent of respondents believed they were more motivated working in a co-working space,

spaces as a real estate play); Nadia Arain, *Ups and Downs: Hot-desking v. Co-working*, VIRGIN, <https://www.virgin.com/entrepreneur/ups-and-downs-hot-desking-v-co-working> (last visited Mar. 15, 2017) (describing the phenomenon of hot-desking, whereby workers share communal computers and work spaces, as a “close cousin” of co-working spaces); Kirstie Chadwick, *The Business Incubator Renaissance is Now*, LINKEDIN (Jan. 2, 2016), <https://www.linkedin.com/pulse/business-incubator-renaissance-now-kirstie-chadwick?forceNoSplash=true> (noting that in some cases, co-working spaces were developed purely as a means of real-estate play).

⁶ See Alessandro Gandini, *The Rise of Coworking Spaces: A Literature Review*, 15 EPHEMERA 193, 195 (2015).

⁷ Gretchen Spreitzer et al., *Why People Thrive in Coworking Spaces*, HARV. BUS. REV. (Sept. 2015), <https://hbr.org/2015/05/why-people-thrive-in-coworking-spaces>.

⁸ Carsten Foertsch, *Why Coworkers Like Their Coworking Spaces*, DESKMAG (Dec. 29, 2010), <http://www.deskmag.com/en/why-coworkers-like-their-coworking-spaces-162>.

and eighty-eight percent believed they had better interactions with other people after moving into a co-working space.⁹

B. Incubators

Incubators represent the next level of sophistication. Like co-working spaces, incubators provide physical infrastructure and basic office services, but, in addition, offer a more comprehensive array of mentorship and networking opportunities. Incubators also offer ready access to professionals like lawyers and financial experts.¹⁰ The concept of a business incubator dates back to the mid-twentieth century, and contemporary incubators exist for a range of different industries.¹¹ Technology incubation represents a more recent variant, focusing specifically on the development of technology-oriented entrepreneurs.¹² According to the National Business Incubation Association (NBIA), approximately thirty-seven percent of incubators in North America focus on technology businesses.¹³

One criticism of incubators is that they encourage startups to develop in such a way that they become dependent on the resources provided by the incubator, and, thus, are unable to thrive in any other setting. This stands in contrast to accelerators, which are dedicated to preparing startups for optimal performance in the market, and, thus, are purposefully designed so as not to become long-term resting places for their ventures.¹⁴ There is a widespread perception that while incubators merely “shelter” vulnerable businesses—protecting them from the harsh, external reality of the market—accelerators are designed to speed up market interactions, teasing out the “winners”

⁹ *Id.*

¹⁰ See Diane A. Isabelle, *Key Factors Affecting a Technology Entrepreneur’s Choice of Incubator or Accelerator*, 2013 *TECH. INNOVATION MGMT. REV.* 16, 17.

¹¹ *The History of Business Incubation*, NAT’L. BUS. INCUBATION ASS’N, http://www2.nbia.org/resource_library/history/index.php (last visited Mar. 15, 2017) (noting that the Batavia Industrial Center, opened in Batavia, New York in 1959, is widely considered to have been the first business incubator in the United States, with rapid growth of the industry throughout the 1980s).

¹² See Isabelle, *supra* note 10, at 16.

¹³ *Business Incubation FAQs*, NAT’L BUS. INCUBATION ASS’N, http://www2.nbia.org/resource_library/faq/ (last visited Mar. 17, 2017).

¹⁴ See Susan G. Cohen & Yael V. Hochberg, *Accelerating Startups: The Seed Accelerator Phenomenon* 9–10 (2014), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2418000.

from the “losers” more quickly.¹⁵ As a result, the term “incubator” is sometimes considered a euphemism for company “life support,” or, in other words, a means of keeping failing companies alive longer than they should be.¹⁶ Meanwhile, accelerators are conceptualized as a means to add value to high-potential startups that most likely would have survived on their own but are able to realize greater or more rapid success with the help of an accelerator.¹⁷

C. Accelerators

The accelerator trend originated with the high-profile success of Y Combinator, a Silicon Valley-based Catalyst program founded by Paul Graham in 2005.¹⁸ Y Combinator counts among its graduates some of the most well-known companies in the startup world, with claims to multibillion-dollar valuations. Prime examples include Airbnb, Dropbox, and Reddit.¹⁹ As the name would imply, accelerators are characterized by a narrower, more explicit focus on actively “accelerating” the development of new startups, in contrast to either co-working spaces or incubators.

An accelerator can be defined as a “fixed-term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event or demo day.”²⁰ The network gained through enrollment in an accelerator program is one of its primary advantages. Once in an accelerator program, one meets venture capitalists, angel investors, corporate executives, and various successful entrepreneurs, many of whom are alumni of the program.²¹

¹⁵ See *id.*; see also Andy Wu, *Do Startup Accelerators Deliver Value? The Economics of Creating Companies (Part 1 of 2)*, MIT ENTREPRENEURSHIP REV. (Aug. 14, 2011), <http://mitsdev.mit.edu/article/do-startup-accelerators-deliver-value-economics-creating-companies-part-1-2> (discussing how accelerators emphasize “preparing startups for the real world” and “explosive growth upon exit”).

¹⁶ See PAUL MILLER & KIRSTEN BOUND, *THE STARTUP FACTORIES: THE RISE OF ACCELERATOR PROGRAMMES TO SUPPORT NEW TECHNOLOGY VENTURES* (2011), <http://www.eban.org/wp-content/uploads/2014/09/14.-StartupFactories-The-Rise-of-Accelerator-Programmes.pdf>.

¹⁷ See Cohen & Hochberg, *supra* note 14, at 10.

¹⁸ See MILLER & BOUND, *supra* note 16, at 14.

¹⁹ Angus Loten, *Tech Startups Benefit from Accelerator Boom*, WALL ST. J. (June 4, 2014), <http://www.wsj.com/articles/tech-startups-benefit-from-accelerator-boom-1401906256>.

²⁰ Cohen & Hochberg, *supra* note 14, at 4.

²¹ *Id.* at 4, 12 (noting that some accelerators provide participants with up to seventy-five meetings with different mentors just within the first month, creating numerous and frequent networking opportunities).

The educational offerings in accelerators can be formal (e.g., seminars and trainings in accounting or marketing) or informal (e.g., casual discussions with mentors, alumni, and other startup founders).²² While incubators tend to be nonprofit organizations, such as universities, accelerators are often for-profit ventures that take equity in their client firms.²³ For instance, Y Combinator makes small investments (around \$20,000) in its participant startups in exchange for an equity stake of somewhere from two percent to ten percent.²⁴ Some contend that, because of this profit motive, the incentives of accelerator managers are better aligned with those of the startup founders than is the case with incubators.²⁵

Another notable difference between incubators and accelerators is the duration of the program. Incubators offer continuous support with ill-defined time limits for participation; a startup venture could remain part of an incubator for anywhere from a few months to several years. Meanwhile, the duration of an accelerator program is demarcated by a clear start date and end date, with each round of the accelerator program limited to a defined number of months, usually three or six.²⁶ In Y Combinator, each cohort of entrepreneurs has only ninety days to design, develop, and launch their product into the market.²⁷ This defined duration also produces the cohort effect, such that a startup founder progresses through each stage of the accelerator with the same group of peers, forming close ties and valuable camaraderie.

Despite attempts to construct an organized typology, the lines of demarcation between co-working spaces, incubators, and accelerators remain fluid. As the entrepreneurial ecosystem has evolved, co-working spaces and incubators have taken on the trappings of the increasingly popular accelerator form, adding services that fall outside their original classification. In some cases, the change may

²² Andy Wu, *Do Startup Accelerators Deliver Value? The Economics of Creating Companies (Part 2 of 2)*, MIT ENTREPRENEURSHIP REV. (Aug. 14, 2011), <http://mits.edu/articledo-startup-accelerators-deliver-value-economics-creating-companies-part-2-2/>.

²³ See Isabelle, *supra* note 10, at 18.

²⁴ See Wu, *supra* note 22 (discussing how some members of the Catalyst community have raised questions about the fairness of the equity-based funding model, given how a two percent stake in a company as successful as Dropbox can translate into \$100 million for the accelerator).

²⁵ Cohen & Hochberg, *supra* note 14, at 11.

²⁶ *Id.* at 10.

²⁷ Isabelle, *supra* note 10, at 20.

even be in name only.²⁸ At the outset of this project, the authors had anticipated being able to categorize each Catalyst as belonging to one of the three groups delineated above, but as the interviews progressed, the authors found that many could not be neatly pigeonholed within one category. That said, the distinctions between the three are significant, because they provide a window into how the Catalyst industry has evolved over time, and how that evolution may impact matters of broader societal concern, such as the gender balance in the startup community.

II

THE GENDER GAP IN ENTREPRENEURSHIP AND TECHNOLOGY

Though women have made great strides in higher education and the job market, they are still severely underrepresented in the startup and technology communities. While women account for half of the United States adult population and approximately forty-six percent of the civilian workforce, they make up only about thirty-five percent of those who start their own businesses.²⁹ According to the Kauffman Startup Activity Index, the population of new female entrepreneurs has actually shrunk over the past decade, decreasing from 43.7% in the 1997 Index to the thirty-five percent figure today.³⁰ The figure for startups with a technology focus is even more striking—only five percent of high technology startups are owned by women, who are more commonly relegated to sectors such as health care, education, or traditional retail.³¹ Moreover, among the small population of women who do decide to become entrepreneurs, many struggle to secure financing. Women received just seven percent of venture funds in 2014, and only seventeen percent of female-led startups successfully

²⁸ *Id.* at 18 (discussing how, in some circles, the term incubator was tainted with a negative connotation after the failure of Internet incubators in the early 2000s dot-com crash, which may have spurred organizations previously referred to as incubators to adopt the nomenclature of accelerator).

²⁹ LESA MITCHELL, *OVERCOMING THE GENDER GAP: WOMEN ENTREPRENEURS AS ECONOMIC DRIVERS*, EWING MARION KAUFFMAN FOUND. 7 (2011), http://www.kauffman.org/~media/kauffman_org/research%20reports%20and%20covers/2011/09/growing_the_economy_women_entrepreneurs.pdf.

³⁰ FAIRLIE ET AL., *supra* note 2, at 5.

³¹ *Women-Owned Businesses (WOBs): NWBC Analysis of 2012 Survey of Business Owners*, NAT'L. WOMEN'S BUS. COUNCIL (2012), https://www.nwbc.gov/sites/default/files/FS_Women-Owned_Businesses.pdf; Angie Chang & Harrison Kratz, *Women at Work: Sound Bytes, Statistics of Women Who Lead (Infographic)*, WOMEN 2.0 (Apr. 18, 2012), <http://women2.com/2012/04/18/women-at-work-sound-bytes-statistics-of-women-who-lead-infographic/#taOcgth2VSrpBzbc.99%20>.

exit venture capital financing, compared to twenty-seven percent of male-led startups.³² A study by the National Women’s Business Council (NWBC) found that among the most successful firms, men launched their startups with six times more capital than women.³³ Furthermore, outsider equity in women’s firms constitutes only 1.3% of their total financing as opposed to 19.4% for men’s firms.³⁴

Postulations abound on why this gender disparity exists and what steps can be taken to increase female representation and success in the technology-entrepreneurship realm.³⁵ Many have cited the culture of the startup community as inherently masculine, compounding the traditional masculinity of aggressive moneymaking with the distinctly tech industry masculinity of the “computer nerd.”³⁶ This culture is

³² U.S. SEN. COMM. ON SMALL BUS. AND ENTREPRENEURSHIP, 21ST CENTURY BARRIERS TO WOMEN’S ENTREPRENEURSHIP (2014), http://www.sbc.senate.gov/public/?a=Files.Serve&File_id=3f954386-f16b-48d2-86ad-698a75e33cc4; Sahil Raina, *Research: The Gender Gap in Startup Success Disappears When Women Fund Women*, HARV. BUS. REV. (July 19, 2016), <https://hbr.org/2016/07/research-the-gender-gap-in-start-up-success-disappears-when-women-fund-women>.

³³ Susan Coleman & Alicia Robb, *Access to Capital by High-Growth Women-Owned Businesses*, NAT’L. WOMEN’S BUS. COUNCIL 27 (2014), [https://www.nwbc.gov/sites/default/files/Access%20to%20Capital%20by%20High%20Growth%20Women-Owned%20Businesses%20\(Robb\)%20-%20Final%20Draft.pdf](https://www.nwbc.gov/sites/default/files/Access%20to%20Capital%20by%20High%20Growth%20Women-Owned%20Businesses%20(Robb)%20-%20Final%20Draft.pdf).

³⁴ *How to Close the Startup Gender Gap*, WALL ST. J. (Aug. 25, 2014), <http://www.wsj.com/articles/how-to-close-the-startup-gender-gap-1408912047>.

³⁵ See generally MARGARET E. BLUME-KOHOUT, U.S. SMALL BUS. ADMIN., UNDERSTANDING THE GENDER GAP IN STEM FIELDS ENTREPRENEURSHIP (2014); Tonia Warnecke, *Entrepreneurship and Gender: An Institutional Perspective*, 47 J. ECON. ISSUES 455 (2014); Paula E. Stephan & Asmaa El-Ganainy, *The Entrepreneurial Puzzle: Explaining the Gender Gap* (Ga. St. U. Andrew Young Sch. of Pol’y Stud., Working Paper No. 07-09, 2007), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=975953; Andrea M. Matwyszyn, *Silicon Ceilings: Information Technology Equity, the Digital Divide and the Gender Gap Among Information Technology Professionals*, 2 NW. J. TECH. & INTELL. PROP. 35 (2003); Vishal K. Gupta et al., *The Effect of Gender Stereotype Activation on Entrepreneurial Intentions*, 93 J. APPLIED PSYCHOL. 1053 (2008); Philipp Koellinger et al., *Gender Differences in Entrepreneurial Propensity*, 75 OXFORD BULL. ECON. & STAT. 213 (2011).

³⁶ See Nathan Ensmenger, *“Beards, Sandals, and Other Signs of Rugged Individuals”:* *Masculine Culture Within the Computing Professions*, 30 OSIRIS 38, 43–44 (2015) (outlining the construction of a distinctly male “computer nerd” or “hacker” identity throughout the late twentieth century in an effort by males in technology professions to elevate their perceived social status); Claire Cain Miller, *Technology’s Man Problem*, N.Y. TIMES (Apr. 5, 2014), http://www.nytimes.com/2014/04/06/technology/technologys-man-problem.html?_r=0 (discussing how the fifty-six percent attrition rate of women in the tech industry is in part due to a “sexist, alpha-male culture” and how the “anything-goes” culture of startups can allow disrespect and intimidation of female employees to go unchecked); *Valley of the Dudes*, THE ECONOMIST (Apr. 4, 2015), <http://www.economist.com/news/business/21647611-tech-firms-can-banish-sexism-without-sacrificing-culture>

reinforced by exclusionary male-bonding rituals, such as when a partner at the venture capital firm, Kleiner Perkins, hosted an all-male dinner with Al Gore, allegedly because he thought women would “kill the buzz.”³⁷ Moreover, career progression in the startup sector is often dependent upon the work model of long hours and uninterrupted employment, a model that has traditionally favored males.³⁸ Another theory is that women are less likely to have the social networks and personal connections necessary to succeed in the startup sector.³⁹ Though physical capital (i.e., funding, work space, infrastructure) are vital for a startup’s survival in the initial stage, human capital (i.e., access to mentors, peer entrepreneurs, and professionals such as accountants, lawyers, and marketers) is becoming increasingly important for longer-term viability. This is not to say that women are innately inferior to men in formation of social networks. Women are just as adept as, if not more adept than, men in forming relationships; but due to the phenomenon of homophily, they are disadvantaged in the historically male-dominated startup industry. According to the homophily principle, connections are more likely to form between individuals who share certain essential characteristics, such as gender, age, and ethnicity; as a result, our social networks naturally tend toward homogeneity more so than heterogeneity.⁴⁰ Thus, a male-

-made-them-successful-valley (describing how Silicon Valley combines “the frat-boy club of moneymen and the geek club of computer programmers”).

³⁷ See Beth Winegarner, *Pao Kleiner Gender Bias Case Doomed by Law, Personality*, LAW360 (Mar. 31, 2015), <https://www.law360.com/articles/637883/pao-s-kleiner-gender-bias-case-doomed-by-law-personality>.

³⁸ See MAURA MCADAM & SUSAN MARLOW, 2008 INT’L COUNCIL FOR SMALL BUS. WORLD CONF, THE BUSINESS INCUBATOR AND THE FEMALE HIGH TECHNOLOGY ENTREPRENEUR: A PERFECT MATCH? (2008).

³⁹ See CANDIDA G. BRUSH ET AL., WOMEN ENTREPRENEURS 2014: BRIDGING THE GENDER GAP IN VENTURE CAPITAL (2014), <http://www.babson.edu/Academics/centers/blank-center/global-research/diana/Documents/diana-project-executive-summary-2014.pdf> (quoting women entrepreneurs as saying that one of their biggest challenges is breaking into the male-dominated market); Ethan Mollick, *Why Are There More Male Entrepreneurs Than Female Ones?*, KNOWLEDGE@WHARTON (Dec. 14, 2015), <http://knowledge.wharton.upenn.edu/article/why-are-there-more-male-entrepreneurs-than-female-ones/> (discussing how venture capitalists tend to be males, and have predominantly male friends, which creates a strong network of men that is difficult for females to break into).

⁴⁰ See Miller McPherson et al., *Homophily in Social Networks*, 27 ANN. REV. SOC. 415 (2001); see also Roy F. Baumeister & Kristin L. Sommer, *What Do Men Want? Gender Differences and Two Spheres of Belongingness: Comment on Cross and Madson (1997)*, 122 PSYCHOL. BULL. 38 (1997) (discussing how women are interpersonally oriented with a focus on dyadic close relationships, whereas men’s sociality is directed toward larger groups and networks).

dominated industry dependent on networking and access tends to remain male-dominated. As one male venture capitalist noted, male-led startups are more likely to receive funding because “some guy knew some guy from 10 years ago. You know, they went to an all-boys’ high school together.”⁴¹

Given women’s disadvantages in workplace culture and social networking, some have speculated that Catalysts may be particularly effective in addressing the gender-gap issue.⁴² Catalysts specialize in encouraging cooperation and supplying internal and external networks.⁴³ Thus, Catalysts may address the precise issues that are preventing women from breaking through the “Silicon ceiling,” so to speak. The supportive function of incubators and accelerators may foster a culture that is more gender neutral than the traditional workplace, allowing women to take advantage of the same support and advice mechanisms that men have long enjoyed.⁴⁴ Sherry Robinson and Hans Anton Stubberud posit that, though all entrepreneurs are likely to reap benefits from participation in an incubator, women may be especially likely to benefit from the network diversification that an incubator can provide.⁴⁵ Our study provides insight on this question of whether Catalysts do in fact serve as an effective remedy to the long-standing problem of gender disparities in the entrepreneurship and technology domains.

III

RESEARCH DESIGN AND METHODOLOGY

While Catalysts have grown in popularity and prestige, they remain heavily under-researched. The paucity of both qualitative and

⁴¹ See BRUSH ET AL., *supra* note 39, at 19.

⁴² See MCADAM & MARLOW, *supra* note 38.

⁴³ See *supra* notes 3–28 and accompanying text (describing Catalysts and their orientations).

⁴⁴ See MCADAM & MARLOW, *supra* note 38 (noting how incubators focus on commercial potential rather than personal characteristics of the business owner, offering a gender neutral environment).

⁴⁵ See Sherry Robinson & Hans Anton Stubberud, *Sources of Advice in Entrepreneurship: Gender Differences in Business Owners’ Social Networks*, 13 INT’L J. ENTREPRENEURSHIP 83 (2009); see also Alejandro Amezcua & Alexander McKelvie, *Incubation for All? Business Incubation and Gender Differences in New Firm Performance*, 31 FRONTIERS OF ENTREPRENEURSHIP RESEARCH 298, 298–99 (2011) (finding that women-owned incubator firms have better performances than women-owned businesses and suggesting that incubators might help women overcome historical performance gaps and traditional barriers).

quantitative data collected by Catalysts themselves amplifies the urgency of conducting outside research on the industry. In a National Business Incubation Association (NBIA) survey of incubators, one-third of respondents reported not collecting outcome data from graduates of programs.⁴⁶ Recognizing the lack of information regarding how Catalysts actually operate, the authors set out to conduct a preliminary study on this burgeoning industry. Though the study ultimately narrowed in on the issue of gender, the original aim of the study was to obtain a general, comprehensive picture of the role of Catalysts in the startup sector, from the perspective of Catalysts themselves. Specifically, the authors sought to determine what resources and services Catalysts offer to startups, which of those resources and services are deemed most beneficial to startups, and the demographics and defining characteristics of the founders who are involved in Catalysts.

To this end, the study employed a qualitative research method that involved administering surveys to Catalyst managers. Qualitative interviewing techniques are the method of choice when the objective of the study is to develop a deeper understanding of the various aspects of a larger system⁴⁷—in this case, the authors sought to understand the precise operations and dynamics taking place within the quickly evolving Catalyst industry. According to Robert Weiss, research professor at the University of Massachusetts, Boston, and an expert in the field, qualitative interview studies are useful in laying the groundwork for quantitative research.⁴⁸ By uncovering areas of interest, descriptive interview answers can guide quantitative researchers as to which aspects of the research to probe further.⁴⁹ Thus, the survey study was intended to identify evolving trends in the Catalyst community, choose variables that require additional metrics, and determine the issues around which to frame further research.

The survey consisted of 114 open-ended questions designed to elicit answers with a richness of depth that could lead to further pathways for study. After sending out initial inquiry e-mails, the authors set up interviews with Catalyst leadership, either in person or on the phone. The questions focused primarily on the types of startups they work with, the services they offer to their startups, the benefits—

⁴⁶ Isabelle, *supra* note 10, at 13.

⁴⁷ ROBERT S. WEISS, *LEARNING FROM STRANGERS: THE ART AND METHOD OF QUALITATIVE INTERVIEW* (1994).

⁴⁸ *Id.* at 11.

⁴⁹ *Id.*

from their perspective—of their program, and their perceived role in the region’s entrepreneurial ecosystem.

The sample of Catalysts was drawn from five geographically diverse communities—including western, midwestern, and coastal states—characterized by different entrepreneurial ecosystems. The types of Catalysts ranged from well-known accelerator programs to university-supervised incubators to local co-working spaces. Through contacts in the startup community, the authors identified potential interviewees in each of the five chosen regions. In aggregate, the sample consisted of twenty-four Catalysts, distributed among the communities as outlined in Table 1.

Table 1. Interviews by Location

Location	Number of interviews
Mature and exceedingly vibrant startup ecosystem	4
Vibrant but smaller community in a different state	5
Large metropolitan area without a large research institution, but with a growing startup ecosystem	3
Smaller Midwestern metropolitan area with several research institutions nearby	9
Nascent entrepreneurial ecosystem in a smaller metropolitan location near a rural community	3

The twenty-four interviews, each lasting one hour, yielded over two hundred pages of results, and though the answers were varied and covered an extensive range of matters within the Catalyst field, several dominant themes emerged. Many of those themes were consistent with existing literature on the subject. Thus, for this Article, the authors chose to focus on only the most novel findings—namely, those regarding gender disparities and the narrative advanced by Catalysts about gender.⁵⁰ As is the case with most qualitative

⁵⁰ The issue of access to capital for startups in various regions was sometimes raised in the interview responses. The authors have chosen not to address this issue in our Article, however, because many studies and programs designed to increase access to capital for

studies, such findings are better illustrated through case descriptions and quotations rather than the tables and statistics so prevalent in quantitative research.⁵¹

IV RESULTS

Consistent with prior studies on the Catalyst phenomenon, the authors found that: (1) networking and mentorship were considered to be a particularly valuable aspect of Catalyst participation; (2) co-working spaces and incubators are increasingly likely to offer the educational programming characteristic of accelerators; and (3) Catalysts are moving toward adoption of a “guild model” with industry and demographic specialization.

Of particular interest, the study uncovered a discrepancy between the narrative propagated by Catalysts with regard to their propensity for advancing gender equality and the actual gender composition of Catalyst communities. Only four of the organizations interviewed had forty percent or more female participants, and in over sixty percent of the organizations, women made up less than one-third of the participants. Though these results are consistent with the gender gap observed in the broader technology and entrepreneurship industries, they are surprising in light of the claims made by Catalyst leadership about their female-friendly work culture. Many of the interviewees touted the collaborative, “give before you get” working environment that distinguishes Catalysts from other entities within the startup and technology sectors. Specifically, they described the willingness of successful entrepreneurs to offer advice and support to any Catalyst participants, including women. Theoretically, when compared to the homogeneity engendered by rigid, hierarchical organizations, the openness and fluidity of the Catalyst model should produce an inclusive, demographically diverse population. In other words, the narrative of life in a Catalyst community would predict a better outcome for women. The data, however, presents a strikingly different picture.

startups already exist, e.g., the Startup America Initiative initiated by the White House, the recent release of SEC regulations governing equity crowd-funding, and Kauffman white papers such as *Venture Debt: A Capital Idea for Startups* by Patrick Gordon.

⁵¹ WEISS, *supra* note 47, at 3.

V

DISCUSSION

Given that the data does not fit the narrative, the authors tried to consider what counter currents might be at work. Below, we advance three hypotheses as to why Catalysts have failed to alleviate the gender gap in technology entrepreneurship to the same degree that theory would predict.

1. Key Onramps into the Catalyst Community Materialize Earlier in the Educational and Career Pathway, and Women Lack Access to such Onramps.

Though the environment of the Catalyst itself may be particularly suited to supporting female entrepreneurs, the potential suitability is irrelevant if women are unable to gain access to Catalysts and avail themselves of the resources offered. In other words, if they are not getting in the door, what is offered inside cannot help them. Focusing solely on applications to and acceptances into Catalyst programs fails to provide a full picture of where women are encountering barriers to entry. The key onramps into the Catalyst community may materialize long before a startup founder even considers the need for a Catalyst—specifically, during college and/or graduate school.

The time spent in higher education constitutes an important opportunity to gain access to the startup and Catalyst communities, as it is the setting in which early networks are formed. The college and graduate school environments foster the formation of personal connections with peers who hold similar interests, and often those personal connections transform into professional connections over time. The groupings that one day become Catalyst cohorts may be forming in STEM (science, technology, engineering, and math) classrooms and research labs, places where females have been consistently underrepresented. In 2014, women made up fifty-seven percent of bachelor's degree recipients but only seventeen percent of computer and information sciences bachelor's degree recipients.⁵² Females are also underrepresented in groupings outside of the formal academic setting. For instance, college hackathons—collaborative events in which computer programmers work together to develop software programs in a limited period of time—are considered sites

⁵² *Women and Information Technology: By the Numbers*, NAT'L CTR. FOR WOMEN & INFO. TECH. (2016), <https://www.ncwit.org/resources/numbers>.

where the “entrepreneurial citizenship” emblematic of Silicon Valley is cultivated.⁵³ Unfortunately, women are largely absent from such sites. For example, in one survey of hackathon participants across the country, females made up only eleven percent of the attendees.⁵⁴ Again, the problem is largely cultural, with the university computer labs in which such “hacking” takes place representing distinctly male social spaces.⁵⁵ As a result of their involvement in tech-related educational and extracurricular enterprises in the university setting, males may be boarding the onramp into the Catalyst community long before they submit an application to an accelerator, perhaps before they have even conceived of their startup proposition. Women lack the same opportunities for technology entrepreneurship networking and group formation in educational institutions, and, as a result, they accrue disadvantages before the official point of entry into Catalysts. This suggests that one avenue toward obtaining a more equitable gender balance in the Catalyst population is helping women gain access to the onramps that emerge during college and graduate school.

Of course, as many others have observed, the problem arises much earlier. The ratio of women to men in STEM fields steadily diminishes from the early schooling years through post-graduate programs, creating what is known as the “pipeline shrinkage problem.”⁵⁶ Throughout their education, girls are explicitly and implicitly discouraged from pursuing STEM. Even elementary school children express awareness of and belief in stereotypes such as “boys are better at math than girls” and “scientists and engineers are men.”⁵⁷ Because of the phenomenon known as “stereotype threat,” these preconceptions lead female students to actually perform worse on

⁵³ See Lilly Irani, *Hackathons and the Making of Entrepreneurial Citizenship*, 40 SCI. TECH. & HUM. VALUES 799 (2015).

⁵⁴ Gerard Briscoe & Catherine Mulligan, *Digital Innovation: The Hackathon Phenomenon*, QUEEN MARY U. LONDON 6 (May 2014), <https://qmro.qmul.ac.uk/xmlui/bitstream/handle/123456789/11418/Briscoe%20Digital%20Innovation%3a%20The%20Hackathon%20Phenomenon%202014%20Published.pdf?sequence=2>.

⁵⁵ See Ensmenger, *supra* note 36, at 43, 59 (outlining how marathon coding sessions represented a new means by which male adolescents could prove their masculinity, and how the computer lab as a male bonding site has been replicated in the “play areas” and “tree houses” at tech firms and startups).

⁵⁶ MCADAM & MARLOW, *supra* note 38.

⁵⁷ See Stephen J. Farenga & Beverly A. Joyce, *Intentions of Young Students to Enroll in Science Courses in the Future: An Examination of Gender Differences*, 83 SCI. EDUC. 55 (1999); see also Nalini Ambady et al., *Stereotype Susceptibility in Children: Effects of Identity Activation on Quantitative Performance*, 12 PSYCHOL. SCI. 385 (2001).

math and science exams than their male counterparts, translating into reduced interest in STEM careers.⁵⁸ As students progress from elementary school through high school, the percentage of females who elect math and science classes becomes increasingly smaller. In 2015, though fifty-six percent of Advanced Placement (AP) test-takers were female, only twenty-two percent of AP Computer Science test-takers were female.⁵⁹

Even for those women who do succeed in pursuing STEM through higher education and into academia—perhaps even developing research that would be conducive to a high-growth startup—the onramp into entrepreneurship remains difficult to access. Waverly W. Ding and colleagues conducted a longitudinal study on patenting in the academic life sciences by following a sample of 4227 life science research faculty members over a thirty-year period.⁶⁰ Though the quality of the research conducted by the male and female scientists was comparable, the women patented at only forty percent the rate of the men.⁶¹ The cause of this gender gap in “academic entrepreneurship” traces back to the gender differences in formation of personal networks. The women interviewed in the study noted that they lacked contacts in relevant industries. Thus, they had difficulty gauging whether their research was commercially viable and whether it was worth pursuing a patent.⁶² When the female faculty did decide to seek commercialization, they tended to rely on formal institutional mechanisms, such as the Technology Transfer Office (TTO) at their universities. Meanwhile, by virtue of their expansive, previously-formed networks, male faculty had the luxury of choosing to bypass the institutional route and simply place a call to an industry contact. Given that obtaining a patent is a key milestone along the pathway

⁵⁸ See Steven J. Spencer et al., *Stereotype Threat and Women's Math Performance*, 35 J. EXPERIMENTAL SOC. PSYCHOL. 4 (1999); see also Toni Schmader, *Gender Identification Moderates Stereotype Threat Effects on Women's Math Performance*, 38 J. EXPERIMENTAL SOC. PSYCHOL. 194 (2002).

⁵⁹ See *Women and Information Technology: By the Numbers*, supra note 52.

⁶⁰ Waverly W. Ding et al., *Gender Differences in Patenting in the Academic Life Sciences*, 313 SCIENCE 665 (2006).

⁶¹ *Id.* at 665.

⁶² *Id.*; see also Waverly W. Ding et al., *From Bench to Board: Gender Differences in University Scientists' Participation in Corporate Scientific Advisory Boards*, 56 ACAD. MGMT. J. 1443, 1454 (2013) (noting how in a sample of 720 members of Science Advisory Boards (SAB) for biotechnology companies only 6.8% were women).

toward initiating a startup, these findings suggest that patenting is another entry point at which women fail to gain access.⁶³

Thus, the problem of gender disparity in Catalyst participation may be completely extraneous from the Catalyst locus itself. Rather, it may be symptomatic of female disadvantages in gaining access to onramps, particularly in educational institutions.

2. The Trend Toward the High-Intensity Accelerator Model Implicitly Discourages Women from Participating in Catalysts.

As discussed earlier, Catalysts have begun to converge around the newer, multifaceted accelerator model, responding to a shift in demand away from the earlier models of co-working spaces and incubators. Though this shift is gender neutral on its face, it may inadvertently perpetuate, or perhaps even exacerbate, the gender gap in technology entrepreneurship.

The core problem is that there exists a tension between the requirements of the accelerator model and the gendered social and occupational norms that continue to plague women across the working-age population. Accelerators are exceedingly time-intensive and demanding, especially when compared to older Catalyst forms. The defining characteristic of accelerators is that they reject the drawn-out, gentle nurturance that many co-working spaces and incubators provide in favor of a short, exhaustive period in which startups will either be put on the fast track to success or meet their demise quickly. As Susan Cohen and Yael Hochberg note, in accelerator programs, founders often labor away at an “unsustainable pace . . . often working seven days a week, doing little else but work and sleep.”⁶⁴ This level of commitment is certainly not feasible for everyone, and may be particularly onerous for female entrepreneurs. Angela Benton, the founder of an accelerator program called NewMe, acknowledges that due to work or family obligations, not all startup founders can “drop everything and move to Silicon Valley for 12 weeks.”⁶⁵ Though women have made significant advancements in the workplace, and the gender division of labor is shifting toward greater equality, women still shoulder a disproportionate burden of childcare

⁶³ See MITCHELL, *supra* note 29, at 10–11.

⁶⁴ Cohen & Hochberg, *supra* note 14, at 10.

⁶⁵ Angus Loten, *Tech Startups Benefit from Accelerator Boom*, WALL ST. J. (June 4, 2014), <http://www.wsj.com/articles/tech-startups-benefit-from-accelerator-boom-1401906256>.

responsibilities and household work.⁶⁶ Thus, the high demands of accelerators in terms of time and physical presence may unintentionally create a gender imbalance in the Catalyst participant pool.

Another characteristic specific to accelerators that may unintentionally disadvantage women is their exceedingly competitive application process. The demand for accelerators has risen dramatically in recent years, and, in many areas, the supply is insufficient to meet that demand. Top accelerator programs, such as Y Combinator and TechStars, accept as few as one percent of applicants.⁶⁷ As much as the authors might like to think that selection for these programs is based solely on merit, the reality is that those with personal connections with accelerator managers, past graduates, or other mentors tied to the program most likely have an advantage in gaining admission. As discussed earlier, because the technology startup industry has been traditionally male-dominated, men are more likely to have those preexisting connections, which become especially critical in a selective application process. Thus, while women may be just as qualified for and deserving of places in top accelerator programs, they may be handicapped by the subjective nature of the selection process and their relative dearth of network contacts.

3. The Narrative Is Incorrect. Women Are Not Advantaged by the Open, Fluid Work Environment Cultivated Within Catalysts.

The narrative propagated in theoretical circles and by the Catalyst leadership interviewed is that Catalysts cultivate collaborative, accessible work environments in which women should thrive. It is possible, however, that this narrative is simply incorrect. Though an open workplace culture has its advantages, it may also deprive workers of the tried-and-true, clearly delineated path to success found in more hierarchical organizations. The fluidity of the Catalyst setting

⁶⁶ In a survey of two-parent households, fifty-nine percent of respondents said that the mother plays a larger role in childcare, compared to just five percent that said the father does more, and thirty-six percent who said the responsibility is shared equally. Similarly, forty-one percent of respondents said that mothers take on more household chores and responsibilities, compared to just eight percent who said the father does more, and about half who said the chores are shared equally. *Raising Kids and Running a Household: How Working Parents Share the Load*, PEW RESEARCH CTR. (Nov. 4, 2015), <http://www.pewsocialtrends.org/2015/11/04/raising-kids-and-running-a-household-how-working-parents-share-the-load/>.

⁶⁷ Cohen & Hochberg, *supra* note 14, at 11.

may force its participants to be more proactive and/or aggressive in asking for what they want out of a program. Numerous studies have found that women are less likely than men to make demands and advocate for themselves in the workplace.⁶⁸ Women are less likely to negotiate for higher starting salaries, to ask for a salary raise or promotion once employed, and to initiate negotiations in general.⁶⁹ Females in the workplace may be reluctant to make demands and display assertiveness or aggression in general because of a “backlash effect,” such that women who behave in this way are regarded as cold, domineering, and generally unlikable.⁷⁰ In their book, *What Works for Women at Work*, Joan C. Williams and Rachel Dempsey have referred to this problem as “the tightrope,” reflecting how women have to walk a fine line between being overly placating and being dismissed as “too feminine,” and asserting themselves at the risk of being labeled “too masculine.”⁷¹

⁶⁸ See Linda Babcock et al., *Nice Girls Don't Ask*, 81 HARV. BUS. REV. 14 (2003), <https://hbr.org/2003/10/nice-girls-dont-ask> (citing a study in which only seven percent of female MBAs attempted to negotiate their starting salaries, compared to fifty-seven percent of men, and a second study in which men, on average, planned to initiate their next negotiation in one week, compared to in four weeks for women); Jennifer Ludden, *Ask for a Raise? Most Women Hesitate*, NPR (Feb. 8, 2011), <http://www.npr.org/2011/02/14/133599768/ask-for-a-raise-most-women-hesitate>.

⁶⁹ See Babcock et al., *supra* note 68; Ludden, *supra* note 68. This gender difference in workplace self-promotion likely has a multifaceted explanation. In part, it may be because from an early age, girls are socialized to put the needs of others before their own. Another contributing factor may be that while men are valorized for their aggression, women who aggressively pursue their objectives are inundated with negative stereotypes.

⁷⁰ See Hannah Riley Bowles et al., *Social Incentives for Gender Differences in the Propensity to Initiate Negotiations: Sometimes it Doesn't Hurt to Ask*, 103 ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 84, 87 (2007) (reporting on a study in which participants penalized female job candidates who initiated negotiations for higher compensation more than male candidates who displayed the same behavior, an effect mediated by the perception that such females were less “nice” and overly “demanding”); Laurie A. Rudman & Peter Glick, *Prescriptive Gender Stereotypes and Backlash Toward Agentic Women*, 57 J. SOC. ISSUES 743, 757 (2001) (finding that “agentic” female job applicants, who evinced a more assertive, competitive demeanor, were rated as less socially skilled and less likable than comparable male applicants).

⁷¹ See JOAN C. WILLIAMS & RACHEL DEMPSEY, *WHAT WORKS FOR WOMEN AT WORK: FOUR PATTERNS WORKING WOMEN NEED TO KNOW* 3, 75, 185 (N.Y. Univ. Press 2014). Williams and Dempsey describe how women are burdened with prescriptive bias about how they *should* act, and face backlash if they display ambition because it violates expectations about proper behavior for a woman. *Id.* at 60–65. They cite a study in which women who made statements such as “I like to be the boss” and “I like being in charge” were deemed less hireable and possessing poorer social skills than men who made the same statements. *Id.* at 75. To make matters worse, in many cases the backlash against assertive women comes not from men, but other women, who may feel that their own identities as professional women are being threatened. *Id.* at 185–97.

Even more so than conventional companies, startups and Catalysts reward those who take initiative on their own behalf. Thus, it may be the case that women interested in STEM are more likely to thrive not in the fluid, malleable structure of Catalysts, but rather, within the more predictable structure of corporations and established institutions. In comparison to the entrepreneurial realm, women have had great success in climbing to the upper echelons of technology corporations and university hierarchies.⁷² Though they are still outnumbered by their male counterparts, women at the helms of large firms in the technology industry are not the rarity they may have once been.⁷³ For example, in 2016, Lockheed Martin, Oracle, Hewlett-Packard, Yahoo!, and IBM all had female CEOs, and one can see women presidents at some top research universities today.⁷⁴ This suggests that women have learned to navigate the rigid, predictable reward structure of traditional institutions. Moreover, perhaps the more flexible Catalyst culture, which is lauded as being so beneficial to women, is not the miraculous gender equalizer it has been made out to be. Our survey participants reported that Catalysts are cooperative environments in which sharing information and helping others is the norm. This may be true, but perhaps women participants are doing all of the helping and none of the asking for help.

CONCLUSION

A conundrum arises when our survey respondents' narrative about Catalyst work environments being well-suited to women is contrasted with the actual rates of women in Catalysts. More qualitative and

⁷² See MITCHELL, *supra* note 29, at 10.

⁷³ See Wendy Lee, *Women Rarely Reach Top in Tech, Despite Signs That Diversity Pays*, S.F. CHRON. (Dec. 31, 2015), <http://www.sfchronicle.com/business/article/Tech-industry-still-a-boys-club-especially-in-6730768.php> (citing a study of the top fifteen publicly traded tech companies in the Bay Area, which found that for ten of the fifteen companies, women constituted twenty percent or less of those in leadership positions, but also highlighting notable success stories such as Sheryl Sandberg, Chief Operating Officer of Facebook, and Ruth Porat, Chief Financial Officer at Alphabet).

⁷⁴ See *Women CEOs of the S&P 500*, CATALYST (July 26, 2016), <http://www.catalyst.org/knowledge/women-ceos-sp-500> (citing examples such as Safra A. Catz (Oracle), Meg Whitman (Hewlett-Packard), Marissa Mayer (Yahoo!), Marillyn A. Hewson (Lockheed Martin), and Virginia M. Rometty (IBM)); Kaitlin Mulhere, *Only 3 of the 25 Highest-Paid College Presidents Are Women*, MONEY (Dec. 4, 2016), <http://time.com/money/4589369/private-college-president-salary-gender-gap/> (listing Harvard University President Drew Faust and Renssalaer Polytechnic Institute President Shirley Ann Jackson); see also MITCHELL, *supra* note 29, at 10 (noting in 2011 that Harvard, Yale, and Purdue are among major research universities with women as deans of engineering).

quantitative research is necessary to precisely identify the causes behind this discrepancy between narrative and reality. Our study, however, presents a foundation from which to explore policy approaches to address the gender gap in Catalyst organizations. The authors did interview one program that achieved considerable success in including women entrepreneurs, filling a cohort comprised of eighty-eight percent women. This Catalyst made a concerted effort to find and support women-led companies in a number of ways, such as engaging in targeted outreach.

Adopting a more proactive approach to recruitment of women is a crucial component of increasing female representation in Catalysts, and in the technology and entrepreneurship domains in general. Catalysts tend toward a more informal style of marketing than conventional organizations, using practices such as word-of-mouth advertising or reliance on personal networks to recruit startup founders.⁷⁵ These publicity mechanisms, however, are not conducive toward greater inclusion of women, who report feeling disconnected from the Catalyst community, or remain unaware of the resources available to them.⁷⁶

It is important to emphasize that these efforts to increase female participation should be applied to existing, well-established, and reputable Catalysts—not just to new Catalysts specially styled as “women’s Catalysts.” One of the trends observed in our study, and which has been noted elsewhere in the literature, is the emergence of niche Catalysts centered on particular industries or demographics.⁷⁷ For example, the Catalyst community has attempted to address the gender-gap issue by creating programs that are designed specifically for women or only accept women.⁷⁸ As Karren Knowlton Watkins

⁷⁵ See KARREN KNOWLTON WATKINS ET AL., SUPPORT ORGANIZATIONS AND REMEDIATING THE GENDER GAP IN ENTREPRENEURIAL ECOSYSTEMS: A CASE STUDY OF ST. LOUIS 1, 4 (2015).

⁷⁶ *Id.*

⁷⁷ See Cohen & Hochberg, *supra* note 14, at 2 (noting specialized accelerator programs, such as those that restrict applicants to women or minority-owned startups or university-affiliated startups); MILLER & BOUND, *supra* note 16, at 35 (discussing the launch of accelerators specializing in a particular industry, such as healthcare or education, in an attempt to differentiate themselves from other accelerators); Yael V. Hochberg, *Accelerating Entrepreneurs and Ecosystems: The Seed Accelerator Model*, 16 INNOVATION POL’Y & ECON. 25 (2016) (describing vertical specialization of accelerators into specific industries as the most notable trend in accelerators over the past two years).

⁷⁸ See CREATING INCLUSIVE HIGH-TECH INCUBATORS AND ACCELERATORS: STRATEGIES TO INCREASE PARTICIPATION RATES OF WOMEN AND MINORITY ENTREPRENEURS, JP MORGAN CHASE & CO., THE INITIATIVE FOR A COMPETITIVE INNER

and colleagues have noted, however, in creating separate programming for female startup founders, attention is directed away from making the “mainstream” entrepreneurial ecosystem friendlier to and more inclusive of women.⁷⁹ One primary draw of established accelerator programs is their alumni network. For instance, by virtue of graduating from Y Combinator, a startup founder immediately gains a connection to the founders of Airbnb and Dropbox. Thus, one concern is that funneling women into newer, niche Catalysts deprives them of the immensely valuable networks of preexisting, non-niche organizations. Moreover, being accepted into a high-profile, well-established accelerator program functions as a public sticker of approval. Women do not gain the same signaling benefits when relegated to newer, lesser-known Catalysts, which is the category that most niche, just-for-women Catalysts fall into.

The Catalyst the authors interviewed with an eighty-eight percent female cohort achieved this rate in part by reducing its residency requirements in order to best accommodate female entrepreneurs from all over the country. This residency-based strategy falls into another cluster of policy approaches that addresses the inability of women to meet the physical or temporal demands of Catalysts, especially those on the accelerator model. One solution that has been proposed to alleviate the logistical challenges of accelerator participation is providing such programs through virtual means.⁸⁰ Rather than requiring program enrollees to travel to a specific geographic location—disrupting their ability to meet other personal or familial obligations—these accelerators would allow for remote participation. Participants would receive the same seminars, mentoring, and

CITY (ICIC) (2016), http://icic.org/wp-content/uploads/2016/05/ICIC_JPMC_Incubators_post.pdf?af674c (noting that nine percent of incubators in the United States focus on women entrepreneurs, and identifying twenty-seven incubators and accelerators currently operating that focus on a specific demographic, including Women’s Startup Lab, a women-only accelerator in Silicon Valley); Susan Price, *These Startup Accelerators Help Women Scale Their Companies*, FORBES (Nov. 30, 2015), <http://www.forbes.com/sites/susanprice/2015/11/30/these-startup-accelerators-help-women-scale-their-companies/#aa0fe4612564> (listing ten accelerators designed specifically to aid women-led startups).

⁷⁹ See WATKINS ET AL., *supra* note 73, at 11.

⁸⁰ See, e.g., Salvador Rodriguez, *Tech Diversity: Accelerators Go After Women, Underrepresented Minorities for New Startup Ideas*, INT’L BUS. TIMES (Nov. 10, 2015), <http://www.ibtimes.com/tech-diversity-accelerators-go-after-women-underrepresented-minorities-new-startup-2177805> (identifying Avion Ventures, MergeLane and Women’s Startup Lab as three accelerators that conduct the bulk of their program online and remotely, accommodating female founders with child care or other travel-limiting responsibilities).

resources, but over the Internet rather than in person. Some have raised concerns about the efficacy of such programs relative to their on-site counterparts, citing the importance of face-to-face contacts and the challenges inherent in long-distance mentorship.⁸¹ Women may not reap the full benefits of Catalyst participation through virtual programs, but such programs should certainly be considered as a possible step forward in addressing the gender gap.

Given the considerable magnitude of the gender gap, addressing the immediate onramp into the Catalyst community is likely insufficient. True gender equality in the Catalyst population cannot be achieved without addressing the “pipeline shrinkage” problem—reducing the dropout rate of females along the pathway toward a STEM entrepreneurship career and providing them with access to earlier entry points, such as computer science classes and college hackathons. If the groups that are most likely to participate in Catalysts are forming at earlier stages, such as college and graduate school, then efforts should be directed to include women in those groups as well. With a combination of these policy approaches, it may be possible to bridge the gap between narrative and reality when it comes to female participation in the technology entrepreneurship ecosystem.

⁸¹ See Isabelle, *supra* note 10, at 21.