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Too Much Talk, Too Little Action: The Corporate Side of Gender Diversity in Governance

*Douglas M. Branson**

After twenty years involvement in corporate governance and gender diversity, to me, two items persist. First is that, at this late date, the focus remains, almost exclusively, on aspiring women. Women constitute only half of the equation. Industries and the companies within them constitute the other, and largely neglected, half.

The existing literature on corporate governance and gender diversity say, “women should do this” (get a mentor, network, be aggressive, lean in), or not do this (act too feminine, be overly reticent, be a “bully broad,” bypass immediate bosses, turn into a “queen bee”). The how-to and advice books abound. Nearly all are anecdotal: “I did this,” or “my friend tried that.” Little of the focus has been on companies and industries who, after all, constitute the second half of the equation.

Second is that when companies make an effort, most often the effort consists of words alone rather than actions, of aspirational and noble statements or sentiments rather than plans and implementation of them. True, within certain companies, the words have evolved, say, from diversity training for supervisors and other higher-ups, to “unconscious-bias training,” ballyhooed as the next promising corporate effort to solve this seemingly intractable social problem.¹ In her book, *Women and Leadership*, Professor Deborah Rhode writes: “It is not enough for leaders to proclaim their [generalized] commitment to equal opportunity: they also need to make a corresponding commitment to the policies, programs and reward structures that will encourage it.”²

I have published two books in the area. The first, *No Seat at the Table: How Governance and Law Keep Women Out of the Boardroom*, began at

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1. See Joanne Lipman, *How Diversity Training Infuriates Men and Fails Women*, TIME, Feb. 5, 2018, 17, at 18, excerpted from JOANNE LIPMAN, IT’S WHAT SHE SAID: WHAT MEN NEED TO KNOW (AND WOMEN NEED TO TELL THEM) WORKING TOGETHER (Morrow & Sons, 2018).

2. DEBORAH RHODE, WOMEN AND LEADERSHIP 72 (Oxford Univ. Press, 2016).

the top, examining the nearly exclusive dominance of corporate boards by men.³ *The Last Male Bastion: Gender and the CEO Suite at America's Public Companies* examined the educational and career paths of the twenty-two women who, at that time, had reached the pinnacle at *Fortune 500* companies.⁴ At the time of *The Last Male Bastion*, fifteen women held the highest position out of 500 such seats available.⁵ The *Fortune 500*, of course, consists of the 500 largest U.S. Companies by revenue (historically, Walmart and Exxon top the list but of late Amazon has passed them both).⁶

The next logical step, envisioned for a third book, was to explore inroads women had made into the upper and lower ranks of management, as experience in those positions would lead to inclusion in the pool from which boards chose the upper most managers (CEOs, CFOs, CIOs) and fellow directors. I spent the last three years writing a book about that subject, titling it *The Future of Tech Is Female – How to Achieve Gender Diversity*.⁷ Here, compared to data on the numbers of women on corporate boards and in CEO suites, data was difficult to gather. To gather information across the board seemed nearly insurmountable so the study confined itself to a single industry.

I. CHOICE OF INFORMATION TECHNOLOGY

For my studies, I chose the information technology industry, for two reasons. One, that industry accounts for 21 percent of our gross national product and, two, the industry has one of the worse, if not the worst, records in hiring, treatment, and promotion of women.

Recently, tech leaders Apple and Google passed Coca-Cola as possessing the most well-known and second most well-known trademarks in the world.⁸ Information technology (IT) companies' shares now represent 18 percent of the total capitalization of shares on U.S. securities markets and in that, as well as in other respects such as employment, are

3. DOUGLAS M. BRANSON, *NO SEAT AT THE TABLE: HOW GOVERNANCE AND LAW KEEP WOMEN OUT OF THE BOARDROOM* (NYU Press, 2007).

4. DOUGLAS M. BRANSON, *THE LAST MALE BASTION: THE CEO SUITE AT AMERICA'S PUBLIC COMPANIES* (Routledge & Co., 2010).

5. The number has risen to twenty-three today. By contrast, the number was one in 1997 and only two in 2002. BRANSON, *supra* note 4, at x.

6. In the most current *Fortune 500*, the top four companies, by revenues, are Walmart, \$485.9 billion; Berkshire Hathaway, \$223.6 billion; Apple Computer, \$215.6 billion; and Exxon Mobile, \$205 billion. See *Fortune 500*, FORTUNE, (visited Mar. 21, 2018), <http://www.fortune.com/fortune500list> [<https://perma.cc/JE7M-P4XB>]; C.f. Amrith Ramkumar, *Amazon's Jump to No. 2 Easy as ABC*, WALL ST. J., Mar. 21, 2018, at B-15 (By contrast, in the *Forbes 500*, that ranks companies by market capitalization, the top companies are all technology related entities: Apple Computer, \$889 billion; Amazon, \$768 billion; and Alphabet (Google), \$763 billion).

7. DOUGLAS M. BRANSON, *THE FUTURE OF TECH IS FEMALE: WAYS TO ACHIEVE GENDER DIVERSITY* (NYU Press, 2018).

8. *NBC Nightly News with Brian Williams* (NBC television broadcast Sept. 30, 2014).

growing.⁹ Growth can also be seen in other areas, such as employment.¹⁰ In rough terms, IT's market capitalization is equivalent to 16 percent of 127.2 percent of \$18.86 trillion (estimated 2016 U.S. gross domestic product), or \$3.84 trillion.¹¹ That valuation, for one industry alone, exceeds the total gross domestic products of France (\$2.59 trillion) and the United Kingdom (\$2.65 trillion), and rivals Germany's. U.S. IT's market capitalization trails only Japan's and China's GDPs.¹² United States information technology deems itself "the emerging center of the world," and rightly so.¹³

Yet tech is the most backward of major U.S. industries in promoting women to leadership positions or positioning them for future ascension into executive positions. Even lower down in the ranks, the number of women tech companies employ has declined from 37 percent of employees in 1995 to 24 percent today (2016), with prognostications that the number will decline further, to 22 percent or lower in the next decade.¹⁴

Higher up, in leadership ranks, as revealed in compensation tables that companies file with the Securities and Exchange Commission (SEC), women account for only 5.5 percent of the most highly paid tech company executives.¹⁵ The underrepresentation of women—and the lack of diversity overall—is stark and noteworthy.

Furthermore, despite awareness of the issues involved within the industry, the situation does not improve. Jodi Kantor of the *New York Times* titled her 2014 in-depth study "A Brand New World in Which Men Ruled: Instead of Narrowing Gender Gaps, the Technology Industry

9. Jason Zwieg, *Three New ETF Ideas That Really Make Sense*, WALL ST. J., Aug. 20, 2016, at B1.

10. *Id.*

11. See Press Release, Bureau of Econ. Res., Gross Domestic Product, 4th Quarter & Annual 2016 (Advance Estimate) (Jan. 27, 2017), <http://www.bea.gov/news/2017/gross-domestic-product-4th-quarter-and-annual-2016-advance-estimate> [https://perma.cc/Y97X-NM8Z] (GDP of \$18,861 trillion); see YCHARTS (visited Feb. 7, 2017) www.ycharts.com (as of February 7, 2017, statisticians estimated market capitalization as 127.2 percent of gross domestic product, or \$23.99 trillion).

12. See *List of Countries by Projected GDP*, STATISTICS TIMES, Apr. 23, 2017, www.statisticstimes.com (The GDPs of France, Germany, and the United Kingdom are \$2.4 trillion, \$2.85 trillion, and \$3.4 trillion, respectively. The GDPs of Japan and China are \$4.8 trillion, and \$11.8 trillion, respectively.).

13. Farhad Manjoo, *In Defeat, a Woman Disrupts How Silicon Valley Does Business*, N.Y. TIMES, Mar. 27, 2015, at B1.

14. Jessica Guynn, *Women in Computing to Decline Even More*, USA TODAY, (Oct. 20, 2016), <https://www.usatoday.com/story/tech/news/2016/10/20/women-in-computing-to-decline-22-percent-by-2025-study-warns/92438566/> [https://perma.cc/S98V-Y84A] (statistics jointly published by consulting firm Accenture and not-for-profit Girls Who Code).

15. BRANSON, *supra* note 7, at 8.

Created Vast New Ones.”¹⁶

By way of comparison, women constitute 19.2 percent of directorships in large corporations generally, 19 percent of Congress, 21 percent of Fortune 500 general counsels, and 26.4 percent of college and university presidents.¹⁷

In information technology, of those women in executive positions, a supermajority of them have law degrees (JDs) or master's degrees in business administration (MBAs), leading one to question the headlong push for STEM (science, technology, engineering, and mathematics) education for women. Or, at least, educators should consider modifying the STEM emphasis in ways more conducive to assumption of leadership roles.

I had originally planned to title my forthcoming book *The Boo List and the Paradox*, referring to what had attracted me to the subject in the first place, namely, that while only 5.5 percent of senior executives in tech are female (the “boo list”), compared with 25 percent for U.S. public companies generally, twelve large IT corporations have had female CEOs (the paradox). But the present title helps in better answering the question early reviewers posed: “Who is the audience?” Throughout, the book emphasizes that the audience is the industry and companies within it. In contrast, again, the books on the market today are advice or “how-to” books. A recent leader in that regard, featured on the cover of *Time* no less, was Sheryl Sandberg's *Lean In* (2013),¹⁸ yet another “how-to” book for women.

Few authors—maybe none—have written extensively about what the industry and individual companies within it might do.¹⁹ Those who do write about the area have given the industry a free pass. It's high time for observers, pundits, and scholars to turn the spotlight on the corporations themselves. With the illumination so provided, finger pointing—indeed, a significant amount of finger pointing—is in order. What can and should the industry and companies within it be considering, evaluating, and possibly adopting to solve this social and economic problem?

16. Jodi Kantor, *A Brand New World in Which Men Ruled: Instead of Narrowing Gender Gaps, the Technology Industry Created Vast New Ones*, N.Y. TIMES, (Dec. 23, 2014), <https://www.nytimes.com/interactive/2014/12/23/us/gender-gaps-stanford-94.html> [<https://perma.cc/3HMU-VFCC>].

17. RHODE, *supra* note 2, at 2.

18. SHERYL SANDBERG, *LEAN IN: WOMEN, WORK, AND THE WILL TO LEAD* (Knopf Doubleday Publishing Group, Mar. 11, 2013).

19. An exception is Professor Deborah Rhode of Stanford University School of Law. In her newest book, *Women and Leadership*, she devotes subsections of most chapters to recommendations for what organizations might do or should consider; *see generally* RHODE, *supra* note 2.

II. WHY WOMEN?

A question that always arises is, “Why women?,” and the question must be dealt with here, however briefly. Betty Friedan’s *The Feminine Mystique* appeared in 1963.²⁰ Germaine Greer published *The Female Eunuch* in 1970.²¹ Bella Abzug, “Battling Bella,” reached the House of Representatives in 1970.²² Soon after, once the women’s movement had taken root, business leaders and corporate boards made statements and promises on the equality of women in their organizations, promises that nearly fifty years after have only partially been fulfilled in some instances, and not at all in others. While this issue has been with us for a half century, another group of leaders and spokesmen, uniformly men, continue to ask “Why women?,” over and over again.

A number of reasons exist to encourage businesses to expend efforts to include more females on promotion ladders and in senior positions:

Role Models within Organizations. Women as directors and senior managers serve as important role models to the manifold numbers of women lower down in today’s workforces, including the nearly 50 percent of the middle managers who are female.²³

Avoidance of Excessive Risk. The near-death economic experience of 2008-2009 taught the perils of excessive risk and the disregard of sustainability considerations. Women are more aware of and in tune with risk. They are better judges of risk. Christine LaGarde, managing director of the International Monetary Fund, said it well, remarking that “if Lehman Brothers had been Lehman Sisters,” the financial firm would still exist.²⁴

Role Models in Broader Contexts. Today, in stark contrast to forty years ago, young women play sports of all kinds, attend university, go on to graduate and professional schools, become physicians, scientists, airline pilots, accountants, and lawyers (approximately 50 percent of the students in U.S. law schools are women), and obtain MBAs (40 percent of the students in graduate schools of business have been women).²⁵ Women who reach the highest levels in business are important role models for our

20. BETTY FRIEDAN, *THE FEMININE MYSTIQUE* (W.W. Norton & Co .Inc., 1970).

21. GERMAINE GREER, *THE FEMALE EUNUCH* (Paladin Press, 1970).

22. “The test for whether or not you can hold a job should not be the arrangement of your chromosomes.” Douglas Feiden, *Postage Due for Battling Bella?*, STRAUSS MEDIA, (Apr. 10, 2018), <http://www.nypress.com/local-news/20180410/postage-due-for-battling-bella/1> [<https://perma.cc/7P7D-YPLH>].

23. Sharon Bottom, *Why Are There Are So Many Female Managers But So Few CEOs*, THE CONVERSATION, (Mar. 6, 2015), <https://theconversation.com/why-there-are-so-many-women-managers-but-so-few-women-ceos-38447> [<https://perma.cc/522F-N73B>] (“women fill 50 percent of middle management positions globally”).

24. Christine LaGarde, *Women, Power and the Challenge of the Financial Crisis*, N.Y. TIMES, (May 10, 2010), <https://www.nytimes.com/2010/05/11/opinion/11iht-edlagarde.html> [<https://perma.cc/W46V-6PNM>].

25. See, e.g., BRANSON, *supra* note 3, at 151–52 (48.3 percent in 2002 and 48.2 percent in 2003 for law schools; 39.9 percent in 2000 and 40.7 percent in 2001 for MBA programs).

daughters and for succeeding generations of women.

Avoidance of Groupthink. A cast of managers, all or mostly all male, who share common backgrounds, is less likely than a diverse one to ask probing questions or raise objections. The social data support the proposition that the presence of gender diversity is a safeguard against groupthink and its perils.²⁶

Economic Common Sense. Global theorists contrast those nations in which women do not work, say Pakistan, with similar countries in which women work, achieve, and reach positions of influence and power, say, India. Adjusting for differences in countries' respective sizes, the gross domestic product of the latter greatly exceeds the gross domestic product of the former, its neighbor. Theorists go on to attribute much of the difference to the inclusion of women in the labor force and in leadership.²⁷

There are many more reasons given for increasing the number of women on boards of directors, in the C-suite, and in senior management.²⁸ One reason that is unquantifiable but ubiquitous is the promise that boards of directors and corporations have held out to women for a larger and more meaningful role in corporate affairs, promises they have made but not always fulfilled for decades now. As Eleanor Roosevelt said years ago, "A woman is like a tea bag, you never know how strong it is until it's in hot water." It is time corporations live up to the promises they have made, finding out just how right Mrs. Roosevelt was.

For this article, I have chosen to treat two of the more controversial sub-topics in this area. The first is a description and a critique of the industry's efforts to date, mainly to rely upon and to enlarge the H-1B visa program. Through that program, the industry has brought hundreds of thousands of engineers, programmers, and systems analysts, exclusively male, from foreign countries, overwhelmingly India. Corporate spokespersons, executives, and lobbyists give no thought on the great extent reliance on visas crowds out aspiring and deserving women from entry into fields such as information technology.

A second, and to date non-controversial subject has been expansion of STEM education in schools and classrooms. My treatment renders the STEM subject controversial by advocating that at least women who aspire to more senior management positions should temper any STEM concentration with a smattering or more of business courses (managerial accounting, finance, basic economics. Or, after a few years in their first or second position, they should go back to university, pursuing a Master's in

26. See Marleen O'Connor, *The Enron Board: The Perils of Groupthink*, 71 U. CINCINNATI L. REV. 1323 (2003) (a leading piece on group think in corporate cultures).

27. See, e.g., Kristof and WuDunn, *Half the Sky*, at 238; the authors also compare Pakistan and Bangladesh: "One reason that Bangladesh is more stable today is that it invested enormously in women and girls, so that a girl in Bangladesh is far more likely to go to school than a Pakistani girl, and afterward far more likely to hold a job."

28. See generally BRANSON, *The Last Male Bastion*, chap. 10, "Why Women?," at 121-27.

Business Administration (MBA).

Of 39 women who have become *Fortune 500* CEOs since 1997, 24 have had MBA degrees while an additional 3 had business-oriented law degrees, constituting 69 percent of the total. Going down a notch, to the senior executive level, out of a pool of 575 highly paid IT executives, only 27 were female. Of those 27, 25 had business-oriented educational backgrounds (14 MBAs, 5 law degrees, and 6 business-oriented undergraduate majors). Only two of the 27 women had STEM backgrounds (electrical engineering degrees). In the small, small female IT executive sample, the sample's small size itself being part of the message, 93 percent of the women executives had business backgrounds. Overall, although the two samplings differ somewhat, 52 of 66 women, or 78.8 percent, had business educational backgrounds and 38 of the 66, or 58 percent, had MBA degrees.²⁹

III. THE TECH INDUSTRY'S ANSWER: AN EXPANDED H-1B VISA PROGRAM

A. SEVEN HILLS

Seattle, Washington, is like Rome, they say—that is, built on seven hills. In Seattle, though, only six hills remain. The seventh, extending north from the downtown to the shores of Lake Union, no longer exists. Early developers excavated the hill, mixed the earth with water, and piped the slurry into Elliott Bay. By the 1960s, the square-mile area, known as the “Denny Regrade,” had become a haven for used car lots, small manufacturing plants, and warehouses.

The late billionaire Paul Allen, a co-founder of Microsoft, bought up much of the Denny Regrade real estate in order to build a mall stretching from downtown Seattle to Lake Union. Mr. Allen wanted to make Seattle the bio-tech capital of the United States, with bio-tech companies lining the mall. Alas, always tight with their purse strings, the Seattle voters turned down Mr. Allen's grand plan.

Nonetheless, the Denny Regrade has seen a rebirth, as a center of info-tech in Seattle. The used car lots are gone. Now the area is chock-a-block with new seven-, eight-, nine-, and ten-story buildings housing tech offices and tech workers who labor for Amazon and other information technology giants (not Microsoft, most of whose 126,000 employees work across Lake Washington, in the Bellevue and Redmond suburbs).

Visiting the Denny Regrade at lunchtime, I did not see a single female face. The “tech-bros,” as they are known, are entirely male. Moreover, many (most? perhaps 80 or 85 percent) appear to be foreign. A row of food

29. These studies and their implications are discussed in Chapter 16 (“Leavening STEM Education”) and Chapter 17 (“Paying Attention to the Pool Problem”) in BRANSON, *THE FUTURE OF TECH IS FEMALE: HOW TO ACHIEVE GENDER DIVERSITY* (forthcoming, NYU Press, 2018).

trucks serves up tikka masala, green and red lamb curry, chicken vindaloo, and chicken tandoori, as well as other Indian delicacies.

The observations about tech in Seattle highlight the shortsightedness, or tin ear, of the information technology as well as certain other industries. Rather than taking steps to address its obvious failing, discrimination against women in hiring and promotion, information technology companies have chosen to rely, almost exclusively, on guest workers, mostly from India. “Even when faced with severe shortages, [IT] companies did not adopt new strategies that moved women toward parity in the IT field or increased minority participation. . . . [Instead] the industry worked toward raising the caps on the number of H1-B temporary visas.”³⁰

IT workers come to the United States on a visa, the H-1B visa, for three years, frequently with a follow-on extension, also for three years. Not only does the IT industry and community rely heavily on H-1B visas. Industry advocates lobby aggressively for a geometric increase in the numbers of visas that U.S. Citizenship and Immigration Services (USCIS), a component within the Department of Homeland Security, can grant. As far back as 2007, for instance, Bill Gates, the other co-founder of Microsoft, appeared before a congressional committee “warning of dangers to the U.S. economy if employers can’t import more skilled workers to fill job gaps.”³¹ The industry’s obtuseness toward its effect on women thus could project over the mid-term or even longer if the industry and its spokespersons win the day.

Tech companies are further relying on foreign nation-states and their output of male “techies,” rather than training, hiring, and promoting women. Like Carrier or Ford, who wished to ship jobs to Mexico, information technology companies are shipping jobs to India. IBM has become a poster child of sorts, closing a plant in Minnesota and transferring the plant’s five hundred jobs to be carried out in India.³² Google and Facebook employ large support staffs in Madras, Hyderabad, or Bangalore in the south of the Indian subcontinent.

In many instances, shipping jobs overseas may merely result in a more efficient division of labor. Today, divisions of labor take place on a global rather than regional or domestic scale. Corporations situate facilities and functions where costs are low, or lowest, given an adequate supply of skilled workers and technicians, without regard to national borders. Those movements, though, usually do not impact on an important social issue.

30. Kathryn Bartol & William Aspray, *The Transition from the Academic World to the Workplace*, in *WOMEN IN INFORMATION TECHNOLOGY* 40 (MIT Press, 2008).

31. June Kronholz, *Visa Window Opens: Scramble Is About to Begin*, WALL ST. J.: WASH. WIRE (Mar. 28, 2007) <https://blogs.wsj.com/washwire/2007/03/28/visa-window-opens-scramble-is-about-to-begin/> [https://perma.cc/5KMY-6VC4].

32. See Rachel King, *IBM CEO Offers Advice to Trump*, WALL ST. J.: TECH, (Nov. 16, 2016), <https://www.wsj.com/articles/ibm-ceo-offers-donald-trump-advice-1479289309> [https://perma.cc/MPV5-MDDP].

This situation is different. Shipping jobs to India, similar to seeking expansion through increase in the number of H-1B visas, dims the prospects for women in information technology and, ultimately, for leadership positions. Although the industry does not often speak to the issue, many of those in it are aware of the irony, or downright hypocrisy, involved.

In 2014, Jodi Kantor of the *New York Times* did a follow-up study of the 1,700 persons in the class of 1994 from Stanford University, chronicling the utter lack of headway made by women in the class (roughly half the graduates were female) in info tech and in Silicon Valley.³³ One interviewee asked, “Why [does] the Silicon Valley celebrate some kinds of outsiders [foreign nationals from India] but not others?” She lamented the lack of progress, “[t]he Internet was supposed to be the great equalizer. So why hasn’t our generation moved the needle?”

B. STORM CLOUDS ON THE HORIZON

President Trump has long been critical of the H-1B visa program, at least as USCIS administers it. His proposed executive order sets as a goal “to restore the integrity of the program.” Among other things, his administration proposes to reverse earlier executive orders that permitted spouses of H-1B visa holders to work while in the United States. The order will cut back the amount of time a visa holder can work after obtaining a graduate degree in the United States.³⁴

Tech firms’ first response has been to throw the Indian outsourcing firms (for example, Tata Consultancy, Wipro, and Infosys) who “win a large share of the H-1B visas offered through an annual government-run lottery” under the bus. “The tech firms absolutely are going to throw the outsourcers overboard.”³⁵ The H-1B visa lottery, in which the outsourcing firms have played a leading role, may become a thing of the past. Not giving up ground, however, the tech firms plan to take the recruitment and processing programs in-house. As they have done in the past, the tech firms have also loosed a phalanx of lobbyists upon Washington, D.C. Thus far, the emphasis has been on opportunities for U.S. workers generally. Sources do not mention women at all. For example, the preamble to the Trump executive order states, “Our country’s immigration policies should be designed and implemented to serve, first and foremost, the U.S.’s national interest. Visa programs for foreign workers . . . should be administered in a manner that protects the civil rights of American

33. Kantor, *supra* note 15.

34. Laura Meckler & Laura Stevens, *Fear of Crackdown on H-1B Program Causes Rift Between Silicon Valley, Indian Tech Firms*, WALL ST. J., (Feb. 9, 2017), <https://www.wsj.com/articles/fears-of-crackdown-on-h-1b-program-cause-rift-between-silicon-valley-indian-tech-firms-1486664738> [<https://perma.cc/LME3-S35T>].

35. Meckler & Stevens, *supra* note 32.

workers . . . and that prioritizes the protection of American workers.”³⁶

The tech industry's second response to government plans for visa program modifications has been to paint a heart-rending scenario. Speaking for the industry, Brookings Institution spokesperson Gary Burtless has stated,

Important STEM workers have contributed an outsize share to founding new companies, getting patents, and helping build up American companies, which in turn have created . . . hundreds of thousands of jobs. Discouraging such people from applying for visas to enter the United States to work—I can't imagine how that can be considered to be in the American national interest.³⁷

The Burtless response seems similarly unmindful of the crowding out of women by H-1B visa holders and other correlations between hiring and promoting women versus foreign workers.

C. THE H-1B VISA

The visa that permits the holder to work in the United States is known as the “specialty occupation” visa. The applicant must have a bachelor's degree or equivalent. They must have an offer of employment from a U.S. employer. The employment position must be one for which (a) the employer ordinarily requires a degree, and (b) the degree requirement is common for the position in the employer's industry.³⁸

Critics of the specialty occupation visa program, especially labor unions, claim that industry has been sneaking in lower-cost skilled employees to achieve savings, not because of any shortages in the U.S. labor force. In response, the Department of Labor has layered another requirement on H-1B visa applications. The applicant must accompany the paperwork with a Labor Condition Application (LCA) in which the prospective employer certifies that the wage offered the prospective worker meets or exceeds the prevailing U.S. wage in the particular field of employment.

At least at first blush, current law limits the number of H-1B visas to 65,000 per year, a number that industry chafes under as patently insufficient. In lobbying efforts, industry has sought to raise the cap from 65,000 to 180,000 or 185,000 per year. “Our nation's leaders need to fix our broken immigration system, including lifting the cap on H-1B visa. . . . [We] know the battle for talent is global. Encouraging legal, high-skilled

36. Peter Elstrom & Saritha Rai, *The Trump-Valley Fight Starts to Take Shape*, BLOOMBERG BUS. WK., Feb. 6, 2017, at 26.

37. Elstrom & Rai, *supra* note, 34 at 27.

38. *H-1B Specialty Occupations. DOD Cooperative Research & Development Project Workers, and Fashion Models*, USCIS, (Apr. 3, 2017), <https://www.uscis.gov/working-united-states/temporary-workers/h-1b-specialty-occupations-dod-cooperative-research-and-development-project-workers-and-fashion-models> [<https://perma.cc/WDS7-YMYF>] (describing the eligibility criteria for H1-B1 Visas).

immigration is vital for growth and prosperity.”³⁹

D. FURTHER WRINKLES

As noted, the H-1B visa is for a three year term. A further three-year extension that is largely automatic. Ordinarily, under other programs, an applicant for a visa to enter the United States must overcome “the presumption of immigrant status.” Visitors can do so by demonstrating that they have a job or own a house back home, that is, something that will draw them back to their country of origin. Possessions abroad or a job back home helps negate any inference that non-U.S. citizens are engaged in a plot to stay permanently in the United States. In technical terms, the house or job rebuts “the presumption of immigrant status.”

But the H-1B visa is different from other categories of visa. The H-1B visa is what is known as a “dual intent” visa. “The H-1B holder may have legal immigration intent (apply for and obtain a green card)” while still being the holder of a visa for a temporary (albeit lengthy) stay.⁴⁰ Therefore, the visa holder may file an I-140 immigrant petition to begin the green card process and obtain landed immigrant status, which guidelines for other visas do not permit.

Another wrinkle that lobbyists and industry spokespersons downplay, ignore, or misrepresent is the number of visas allowed, most often stating that the number is capped at 65,000. In recent years, the number if H-1B visas granted has greatly exceeded 65,000. Off the top, another 20,000 visas are available for foreign workers who have a master’s or equivalent graduate degree from a U.S. university. They may immigrate to the United States on a student visa, matriculate at a U.S. university, obtain a master’s degree, and then trade their student visa for a skilled occupation (H-1B) one. Skilled workers whose prospective employment is *at (not necessarily for)* a university, a nonprofit research center, or a government facility are also in a category over and above the 65,000 commonly mentioned. In a representative year, the top ten universities alone bought in nearly 5,000 workers on H-1B visas via this pathway.

The number of visas the U.S. Citizenship and Immigration Services grants thus far exceeds 65,000. For instance, in 2011, USCIS granted 129,552 H-1B visas.⁴¹ The year following, FY 2012, USCIS granted 125,991 visas.⁴² By 2014, the number had grown to 162,239. The tech industry misrepresents these figures, maintaining that the H-1B visa programs allows for 65,000, or 85,000 (65,000 plus 20,000 U.S. university

39. See, e.g., Sarah K. Baruah, Joseph D. Roman, & Dennis Yablosky, *More H-1B Visas, Please*, PITTSBURGH POST-GAZETTE, Apr. 28, 2016, at A-11.

40. Henry J. Chang, *Immigrant Intent & The Dual Intent Doctrine*, CHANG & BOOS’ CANADA-U.S. IMMIGR. L. CTR. (last visited Dec. 1, 2017), <http://www.americanlaw.com/dintent.html> [https://perma.cc/8B86-MVBJ].

41. See www.travel.state.gov (2011 statistics).

42. See www.travel.state.gov/visa (2012).

graduates), entrants to the United States when the actual number is double the tech industry's self-serving depiction.⁴³ Journalists, too, uncritically accept the industry's calculations.⁴⁴

E. TRADITIONAL ARGUMENTS PRO AND CON

1. Criticism: Exploitation of Foreign Workers

The Department of Labor (DOL) does not police its Labor Condition Application program, requiring a prevailing wage certification. Knowing that, many prospective employers ignore the prevailing wage requirement. One study found that companies pay H-1B visa workers 27 percent less than they pay U.S. citizens holding equivalent or comparable jobs.⁴⁵ Another study found that IT companies pay skilled foreign workers \$50,000 less than U.S. citizen engineers and programmers. H-1B opponents characterize foreign workers as "indentured servants."

2. Criticism: Crowding Out Qualified U.S. Workers

Employers' motive would be to achieve savings while also addressing a labor shortage. Of course, employers would not have to pay the higher salaries and wages they would have to pay American workers. Senator Chuck Grassley, chair of the Senate Judiciary Committee, elaborates on the manner in which H-1B visa workers possibly crowd out American ones:

The program was intended to serve employers who could not find the skilled workers they needed in the United States. . . . Yet, under the law, employers are not required to prove to the Department of Labor that they tried to find an American to fill the job first. And, if there is an equally or even better qualified U.S. worker available, the employer does not have to offer him or her a job. Over the years the program has become a government-assisted way for employers to bring in cheap foreign labor, and now it appears that these foreign workers take over—rather than complement—the U.S. workforce.⁴⁶

Railing against "rampant, widespread H-1B abuse," then presidential candidate Donald Trump was even stronger in his criticism: "The H-1B program is neither high-skilled nor immigration: These are temporary foreign workers, imported from abroad, for the explicit purpose of sub-

43. See, e.g., Meckler & Stevens, *supra* note 32 ("The H-1B visa program . . . each year grants 65,000 visas for skilled workers and another 20,000 for people with advanced degrees"); see e.g. BRANSON, *supra* note 7, at 152.

44. See, e.g., Newley Purnell, *Indian Workers Fear H-1B Curbs*, WALL ST. J., (Feb. 28, 2017), at B-1 ("Demand is so high for H-1B visas that for the last four years the number of applications has surpassed the entire fiscal year's 85,000 supply").

45. Paul Roberts, *It's High Time to End the Abuse of H-1B Visas*, WALL ST. J.: OPINION, (May 10, 2016), <https://www.wsj.com/articles/its-high-time-to-end-the-abuse-of-h-1b-visas-1462913903> [<https://perma.cc/XQC5-Y5SV>].

46. *Immigration Reforms Needed to Protect Skilled American Workers: Hearing Before the Full Senate Judiciary Comm*, 114th Cong., (2015) (prepared statement of Sen. Chuck Grassley).

stituting for American workers at lower pay.”⁴⁷ More centrist voices, including for instance those of the *New York Times*’s editors, echo Senator Grassley’s and Mr. Trump’s comments, lamenting the exploitation of both foreign workers (“indentured servants”) and American workers.⁴⁸

3. Criticism: Widespread Use as a Trojan Horse Used to Gain Permanent Residence

During his six-year stay, as previously mentioned, and unlike most other visa holders, a H-1B visa holder can simultaneously pursue immigrant status, permitting him to stay for an indefinite period. The allegation is that, from the beginning of stays in the United States, or even earlier, many foreign workers’ true intent is to obtain long-term status as a U.S. resident. No statistics are readily available to prove or disprove this point. Whether the argument is simply a result of xenophobia, or stands on some firmer ground, is not capable of proof one way or the other.

4. Criticism: A Hotbed of Immigration Fraud

A few statistics, however, are readily available. In 2008, for example, USCIS conducted an H-1B Benefit Fraud and Compliance Assessment.⁴⁹ Based on the study, USCIS concluded that 21 percent of the visas granted involved fraudulent applications. Fraud included falsification of educational backgrounds and of skill levels.⁵⁰ Much of the fraud, for the most part consisting illegal applications, is attributed to brokers who, in placing foreigners with jobs in the United States, complete the applications on behalf of workers.⁵¹

Fraud levels are high in art (29 percent of applications) and highest in “accounting, human resources and advertising” (42 percent). Of thirteen categories USCIS defined, though, computer professionals came in third, with a fraud rate USCIS determined to be 27 percent. The rates in other fields are low (medicine and health at 10 percent, education at 9 percent). Moreover, indications are that fraud is nonexistent in other areas (mathematics and physical sciences or social sciences at 0 percent), although the samples of applicants in those categories are small.

47. Donald Trump, quoted in Lauren Collins, *The Model American*, NEW YORKER, (May 9, 2016), <https://www.newyorker.com/magazine/2016/05/09/who-is-melania-trump> [<https://perma.cc/A7AJ-CK5M>].

48. The Editorial Board, Editorial, *Workers Betrayed by Visa Loopholes*, N.Y. TIMES, (June 15, 2015), <https://www.nytimes.com/2015/06/15/opinion/workers-betrayed-by-visa-loopholes.html> [<https://perma.cc/E733-SGQ8>].

49. U.S. CITIZENSHIP & IMMIGRATION SERVICES, H-1B BENEFIT FRAUD & COMPLIANCE ASSESSMENT (2008).

50. *Id.* at 11–12. (thirty-one percent of the same of applications tested misrepresented the bachelor’s degree education level requirement).

51. See, e.g., Davey Alba, *Investigation Reveals Silicon Valley’s Abuse of Immigrant Tech Workers*, WIRED, (Nov. 4, 2014), <https://www.wired.com/2014/11/investigation-reveals-silicon-valleys-abuse-immigrant-tech-workers/> [<https://perma.cc/JE8C-S4SB>].

5. Criticism: H1-B Visas as an Alternative to Integration

Early on in the women's movement, or even before it, the *New York Times* published an article bemoaning the shortage of young scientists in the United States. A subheading read "A Lady Chemist Argues the Answer Is to Tap Female Brain Power."⁵² The same could be said of today's technology industries.

The harshest criticism has been of information technology's reliance on H1-B visas. That harsh criticism has come from those whose mission is to increase the numbers of racial minorities in the industry. "There was not much heard from organized workers at the time of the H1-B visa debates."⁵³ The Reverend Jesse Jackson and his Rainbow/PUSH Silicon Valley Coalition strongly urged additional minority representation in the technology industry, as did the Coalition for Fair Employment in Silicon Valley.⁵⁴ A female group did exist, the Silicon Valley Women in Human Resources, but it seems largely to have become dormant.⁵⁵

IV. AN ASSESSMENT AND THE WINDS OF CHANGE

A. PRESIDENT TRUMP AND OTHER OPPONENTS

Utilization or expansion of the H-1B visa program is not a possible solution to the scarcity—indeed, dwindling number—of women in leadership and other roles in information technology. Indeed, the H-1B visa program represents the antithesis of a solution. H-1B visa applicants "crowd out" women by reducing opportunities for women, especially in technology.

Much of the H-1B visa debate swirls around whether or not there actually is a labor shortage, that is, a shortage of qualified workers domestically. One op-ed voices a resounding "no." The writer points tech worker layoffs in California alone, at Disney and Southern California Edison, among others, H-1B visa holders from India to replace the American workers. The writer further cites as evidence that in 2015 Microsoft, Cisco, and Hewlett-Packard eliminated 60,000 tech jobs. Yet industry members, including the very companies that had eliminated positions, claim a labor shortage and a need greatly to expand the H-1B visa program. The writer ends with a patriotic plea: "Give Americans a fair chance. Don't continue to flood an already saturated tech labor market with more H-1B visas."⁵⁶

52. Betty Lou Raskin, *Woman's Place is in the Lab, Too*, N.Y. TIMES, Apr. 19, 1959, cited in GAIL COLLINS, *WHEN EVERYTHING CHANGED: THE AMAZING JOURNEY OF AMERICAN WOMEN FROM 1960 TO THE PRESENT* 6 (2009).

53. Bartol & Aspray, *supra* note 28, at 407.

54. *See generally* BRANSON, *supra* note 7, at 154.

55. *Id.*

56. Joseph Guzzardi, *U.S. Workers Are Displaced by Those with H-1B Visas*, PITTSBURGH POST-GAZETTE, May 4, 2016, at A-6.

It is difficult to evaluate those statements and the back and forth on the benefits versus the detriments involved.⁵⁷ One thing that is certain, though, is that the worker shortage would be smaller if industry devoted a portion of the resources it devotes to expansion of opportunities for foreign workers to the hiring, training, and promotion of women. From that standpoint, the H-1B visa hullabaloo is an indictment of the industry.

B. PRESIDENT TRUMP'S PRONOUNCEMENTS

During the first few weeks of President Trump's term, a preview of his 2017 executive order restricting the H-1B visa program was leaked, foretelling "sweeping changes" in the H-1B visa program. Immediately, tech companies stated that the proposed order would "hurt their ability to tap the technical talent they need to stay competitive."⁵⁸ Tech company representatives continued to beat this drum as the new year progressed: "Many tech executives worry . . . not the least because of Mr. Trump's frequent criticism of U.S. companies that employ foreign workers. Indeed, a draft executive order proposes re-examining how the government issues H-1B visas for skilled workers, a system frequently used by tech firms."⁵⁹ Since the actions early in President Trump's administration, no further legislative or regulatory initiatives have emanated from Washington D.C.

C. THE INDUSTRY'S RECENT STATEMENTS

According to Microsoft officials, "[c]hanges in U.S. immigration policies that restrain the flow of technical and professional talent may inhibit our ability to adequately staff our research and development efforts." Brad Smith, Microsoft's president, analogized the H-1B visa program to the Dreamers initiative, "a reference to young people who entered the country illegally as children but were allowed to remain by President Obama." The company "believes in a strong and balanced high-skilled immigration system and in broader opportunities for talented and law-abiding young people."⁶⁰

Along similarly dramatic lines, Facebook CEO Mark Zuckerberg wrote, "We are a nation of immigrants. . . . I hope we find the courage and compassion to bring people together and make this world a better place."⁶¹

Robert Atkinson, president of the Technology and Innovation Research Group, an organization several large tech firms have underwritten, forecast

57. See PETER CAPPELLI, *WILL COLLEGE PAY OFF? A GUIDE TO THE MOST IMPORTANT DECISION YOU'LL EVER MAKE* (Public Affairs, 2015) (recites that only approximately one-fifth of U.S. STEM university graduates have jobs in STEM fields).

58. Nick Wingfield & Mike Isaac, *Tech Industry Frets over Visa Program*, N.Y. TIMES, Jan. 28, 2017, at A-10.

59. Christopher Mims, *U.S. Tech Faces Homegrown Threat*, WALL ST. J., Feb. 3, 2017, at B-4.

60. Wingfield & Isaac, *supra* note 57.

61. *Id.*

another doomsday scenario: “The effect would end up being exactly the opposite of what Trump wants. Companies would go offshore like Microsoft did with Vancouver, Canada.”⁶² Mr. Atkinson continued: “Microsoft is hardly alone. Apple, Google, Facebook, Cisco and dozens of other large U.S. tech companies have established offices in Canada for the same reason,” namely, the easier path to obtaining visas for foreign workers.⁶³ A Microsoft spokesperson has eased off that position, saying that “while immigration laws haven’t been a primary driver of the company’s investment in Canada, they’ve certainly been a contributing factor.”⁶⁴

The tech industry representatives’ statements appear to be overemphatic. They may in fact signal overdependence on the H-1B visa program to the detriment of other sources such as women and minorities.

D. THE OTHER SIDE IS HEARD

As the issues surrounding the program have attracted more attention, Main Street opponents of the tech industry campaign have come forward. A young American electrical engineer, an MIT graduate no less, writes to the *Wall Street Journal*, if there is any program that has been more abused to the detriment of American workers, it is the H-1B visa program. Tech companies use it to bring in foreign workers at the expense of American Stem graduates:

There are currently about 90 million people between the ages of 18 and 65 unemployed in the U.S. What efforts are being made to train the workers that are needed? . . . It is close to the truth that [tech] corporate leadership has abdicated its responsibility to the country and its workers.⁶⁵

The young engineer concludes, “There’s not a greater need for H-1B visas. What is needed is more responsible corporate leadership.”

At the *Wall Street Journal*, as at other newspapers, the practice is to select letters to the editor that express varying points of view on an issue. In this instance, the published letters all opposed expansion of the H-1B visa program. A senior engineer wrote, “In my 40 years working on the aerospace industry, I have seen many ill effects of the [H-1B visa] program. It’s being used to depress American engineering salaries. Its elimination would greatly benefit American engineers.”⁶⁶ Would curtailment of the program, or at least unwillingness to expand it, benefit women in tech as well?

62. Wingfield & Isaac, *supra* note 57.

63. Mims, *supra* note 58.

64. *Id.*

65. Len Lindenmeyer, Letter to the Editors, WALL ST. J., Feb. 9, 2017, at B-4.

66. James Phelan, Letter to the Editors, WALL ST. J., Feb. 9, 2017, at B-4.

V. LEAVENING STEM EDUCATION

A. FEW REAL STEM MAJORS OR DEPARTMENTS

STEM education overtures frequently have less substance than one would believe. At the high school level, STEM still means enrollment in the “pipeline courses” (trigonometry, calculus, chemistry and physics, computer science, programming) that lead to the STEM concentrations or majors at college or university.⁶⁷ At university, the majors and departments remain what they have been traditionally: science, mathematics, engineering of various stripes, and technology. Often, then, STEM is an area of emphasis, a mental outlook, or a frame of mind, perhaps backed by a STEM advisor or an advising office.

At worst, then, STEM resembles a Western movie set, with false fronts lining Main Street. The question then becomes how to “dress” the set, to give STEM programs and offerings backbone and better equip STEM graduates for the job market and success beyond that. What can be added to the current array to give women in particular an increased chance for hiring, promotion, and further promotion in information technology?

The current array has not produced the results sometimes forecast for it.⁶⁸ “Many graduates in science, technology, engineering, and mathematics—the so-called STEM subjects, which receive so much official encouragement—are having a tough time getting the jobs they’d like.”⁶⁹ Again, *Will College Pay Off?*, by Professor Peter Cappelli reports that only about a fifth of recent STEM graduates got jobs that made use of their training. “The evidence for recent grads suggests clearly that there is no overall shortage of STEM grads,” Professor Cappelli writes.⁷⁰

B. ETIMOLOGY OF THE IDEA

The idea that STEM programs might need some leavening does not originate with Professor Cappelli, although his findings support it. A germ of the idea comes from a book published in 2010 entitled *The Last Male Bastion: Gender and the CEO Suite in America’s Public Companies*.⁷¹ In that book, I examined the educational backgrounds and careers of the twenty-two women who, at that point, had become *Fortune 500* CEOs, of

67. See, e.g., Lecia J. Barker & William Aspray, *The State of Research on Girls and IT*, in Cohoon & Aspray, *supra* note 28, at 18.

68. See, e.g., Claudia Goldin & Lawrence F. Katz, *THE RACE BETWEEN EDUCATION AND TECHNOLOGY* (Belknap Press, 2008) (technological progress has greatly increased the demand for skilled workers, including in information technology, and the American educational establishment has failed to meet the challenge by supplying enough graduates who can carry out the tasks a high-tech economy requires).

69. John Cassidy, *College Calculus: What is the Real Value of a College Education?*, NEW YORKER, Sept. 7, 2015, at 83.

70. See generally Cappelli, *supra* note 53.

71. BRANSON, *supra* note 4.

whom fifteen were still in office as *The Last Male Bastion* went to press.⁷² A goal was to find out what courses of study and career paths these women had followed, rather than rehash the guidance and shoot-from-the-hip tips offered by the business advice books for women.

That exercise led to a number of findings, some of them more counterintuitive than others.⁷³ One unsurprising finding was that education matters, more so for women than for men. All twenty-two women in my CEO sample had bachelor's degrees. These included degrees from elite colleges and universities (Stanford, Princeton, Columbia, Georgetown, Rice; Wellesley, with three CEO graduates, was the leader). The list also included degrees from lesser-known or regional institutions (Queens College, New York; University of Florida; Augustana, Illinois; Maryhurst, Oregon; Marymount, New York).

Beyond that, the sample had to be truncated, albeit slightly. One CEO and her company, Carol Meyrowitz and TJX, refused to release information about Ms. Meyrowitz. The sample of twenty-two became a sample of twenty-one.

Sixteen of the remaining twenty-one women CEOs had advanced degrees. There were twelve MBAs and one law degree (Angela Braly, CEO of Wellpoint, JD, Southern Methodist University). Carol Bartz, Yahoo! CEO at the time, had an advanced degree in computer science (Ph.D., University of Wisconsin). Irene Rosenfeld, then Kraft Foods CEO, had a Ph.D. in marketing and statistics (Cornell) as well as an MBA (also Cornell). Ursula Burns, Xerox CEO, had a master's degree in electrical engineering (Columbia University). Only five in the twenty-one-member CEO group had not progressed beyond a bachelor's degree, at least in a formal educational setting.⁷⁴

Because so many of the female CEOs had advanced degrees in business, a question that arose was, Where did the MBAs come from? More than half the MBAs came from elite schools (Harvard [three], Yale, Columbia, MIT, New York University, Northwestern) and less than half but still a significant number from less well-known or regional schools (Bellarmine, in Louisville, Kentucky; Loyola, in Chicago; University of Maryland).

72. The twenty-second, Ursula Burns, became CEO of Xerox while the book was in final stages of the editorial process. *Id.*

73. One refrain advice books often repeat for women in business is to forgo having children or to limit yourself to a single child. A counterintuitive finding from studying the women who had reached the CEO position by 2010 was that nineteen of the twenty-one women CEOs *The Last Male Bastion* categorizes have children. See BRANSON, *supra* note 4, at 199. If Ursula Burns, who became CEO of Xerox while the book was in press, is factored in (she has two children) the total becomes forty-four children for twenty women CEOs (out of twenty-two total). Several of these women CEOs have three children. The late Brenda Barnes, then CEO of Sara Lee, spoke for many female CEOs when she stated that rather than her children needing her, she needed her children, to give her unconditional love and a sense of perspective at the same time.

74. They were Jill Barad at Mattel, Pat Russo at Lucent, Mary Sammons at Rite Aid, Laura Sen at BJ's Wholesale Club, and Anne Mulcahy at Xerox. *Id.*

C. LESSONS LEARNED EXAMINING CEO CAREER PATTERNS

The examination of these CEOs' career patterns produces three major lessons for women executives.

Don't be lopsided. The women with broader skills and backgrounds, even if they had a technical specialty, advanced to senior management and then the corner suite. Very often they had an advanced degree, especially a master's degree in business administration (MBA).

By contrast, though the sample is small, we may observe that the women who primarily had only a technical specialty had a short tenure in the CEO's office. For example, Jill Barad's short tenure at Mattel highlights her fixation with marketing and, more specifically, marketing the Barbie line of dolls. Mary Sammons, whose exclusive background was retailing, was unable to lift Rite Aid from the doldrums. A CEO or a senior manager must know about operations, supply chain management, distribution, markets, strategy, revenues, profits, share prices and finance, supply chain, and a host of other topics beyond her specialty.

The direct implication of the survey was that, at a minimum, boards of directors regard women with an MBA degree as possessing the "right stuff," or some of it, to qualify for senior management positions.

Go get an MBA. This has long been the advice for young men and women in business.⁷⁵ After working three, four, or five years in an entry-level position, followed by a few years in the job after the first promotion, go back to school. In fact, many of the leading business schools regard practical seasoning as a de facto requirement for admission.

The market reflects and reinforces both the advice and the empirical evidence from examining female CEO career patterns. Over the last decade, "the number of applicants seeking admission to M.B.A. programs grew at 57 percent of schools world-wide offering full-time, two year programs."⁷⁶ Between 2014 and 2015, MBA applications increased 15 percent at Harvard School of Business, to approximately 9,900 applications. Other MBA schools experienced greater gains: Yale School of Management, 25.1 percent; University of North Carolina Kenan-Flagler School of Business, 23.2 percent; and Georgetown University McDonough School of Business, 16.4 percent.⁷⁷ More recently, some of the lesser-known MBA schools have downsized or closed their doors altogether, but the elite MBA schools seem to be prospering.

Broaden STEM tracks. Specifically, universities and advisors should point STEM majors toward a mini-track, a course sequence, that gives them some idea of the milieu in which, hopefully, they will function in the

75. See generally NICOLE M. LINDSAY, *THE MBA SLINGSHOT FOR WOMEN: USING BUSINESS SCHOOL TO CATAPULT YOUR CAREER* (Praeger, 2014).

76. Lindsay Gellman, *Why More People Want an MBA*, WALL ST. J., (Sept. 30, 2015), <https://www.wsj.com/articles/why-more-people-want-an-m-b-a-1443647494> [https://perma.cc/Z27D-2UH3] (statistics from Graduate Management Admission Council).

77. *Id.*

world beyond college. A mini-track would not replicate an MBA but would give STEM majors an idea how product markets and supply and demand work. Down the line, material about finance (stocks and bonds, mutual and hedge funds, private equity, analysts and financial advisors) may aid students in managing their personal financial affairs as well as better understanding corporate financial matters. A dose of managerial accounting would tell students what financial statements are, what they tell the reader, more importantly what financial statements do not tell, how books may be cooked, and the ubiquity of financial reporting among units, divisions, subsidiaries, layers of subsidiaries, and publicly traded corporations.

A few universities have already implemented this sort of course selection through joint programs. For example, Carnegie Mellon University offers a master of science degree in computational finance, which draws upon offerings and faculty from the Department of Computer Science, the Heinz School of Public Administration, and the Tepper School of Business.⁷⁸

D. SECOND CEO STUDY

The Last Male Bastion's study was in 2010. Since that time, other women have succeeded to Fortune 500 CEO seats, still others have stepped down or retired, and members of a further group have, effectively, received pink slips. The number of female CEOs stood at fifteen in 2010, rose to twenty-four in ensuing years, and settled back to twenty-two more recently.

Eliminating the duplicates with the 2010 study (there are only three holdovers from the 2010 women CEO group)⁷⁹ leaves nineteen of twenty-two female CEOs of Fortune 500 companies. Seventeen of the nineteen have advanced university degrees. Three have advanced degrees in electrical engineering (two masters and one Ph.D.). Two have law degrees, one from the University of Pennsylvania and one from the University of Texas.

Again, though, the most noteworthy finding is that twelve of nineteen female CEOs have MBAs. The balance seems to be tipped a bit more in favor of elite colleges and universities: Columbia and Stanford, with two each, and Pennsylvania's Wharton School, with one. Lesser-known and regional universities, though, are still represented: Bellarmine University (Louisville, Kentucky) once again, Webster University (Webster Groves, Missouri), and Baylor University (Waco, Texas) (a major university but one not particularly known for its MBA program). The results in 2016

78. Laurie Weingart, Forging Stronger Connections for Tepper School, PITTSBURGH BUSINESS TIMES, (Dec. 11, 2015), <https://www.bizjournals.com/pittsburgh/print-edition/2015/12/11/forging-stronger-connections-for-tepper-school.html> [<https://perma.cc/3B9W-7CXD>].

79. Indra Nooyi at PepsiCo, Irene Rosenfeld at Kraft (now at Mondelez), and Meg Whitman, until recently at Hewlett Packard Enterprises.

seem not dissimilar from those in 2010.

E. META-STUDY

Is a study based upon two other studies a “meta-study”? Probably not, but academics are enamored of throwing around that “meta” modifier. Be that as it may, combining the two studies yields thirty-nine women who have held Fortune 500 CEO chairs since Jill Barad, at least in the modern era, became the first in 1997 (twenty-one from the 2010 study, plus twenty-two from the 2016 study, minus duplicates and nonparticipants equals thirty-nine). All thirty-nine have bachelor’s degrees from known universities. Thirty-two of those women hold advanced degrees, including two who hold Ph.D.s.

There are five female CEOs who hold STEM-type advanced degrees: three engineering (all by chance in electrical engineering) and two computer science (Carol Bartz and Melissa Mayer). Three female CEOs hold law degrees, all from well-known law schools (Southern Methodist University, University of Pennsylvania, and University of Texas). The most dominant finding, though, seems to be that twenty-four of the thirty-nine women hold master’s degrees in business administration, or MBAs.

A case may be made for adding three to the number twenty-four, representing law degrees in the CEO group. A law school business law curriculum replicates much of what an MBA course of study would contain. Courses in business organizations, agency and partnership, corporate governance, corporate finance, mergers and acquisitions, accounting for lawyers, securities regulation, income tax, and corporate income tax add up to twenty-four semester hours, equivalent to many MBA programs.

Adding back the three to the twenty-four is something of a leap of faith, albeit a small one, for the addition assumes that the female CEOs followed a business track in their law school careers. But if one makes that leap, assuming the known unknowable, the number of CEOs with business-oriented education backgrounds rises to twenty-seven. Of the thirty-nine women who have succeeded in reaching the top positions in major corporations, then, 70 percent (69.23 percent) have MBAs or similar education backgrounds.⁸⁰ In contrast, among those same women, five, or 12.8 percent, have STEM degrees. Below the CEO level, the evidence is scarce but some does exist. In 2015, overall, chief financial officers in public companies had average pay raises that exceeded those of CEOs. Two of those ten highest-paid CFOs were women with business backgrounds. Moreover, both were in or soon to be in information technology companies: Safra Catz at Oracle (now co-CEO) and Ruth Porat at Morgan Stanley (who soon left for Google).

80. See, e.g., BRANSON, *supra* note 7, at 162 (2010 CEO study), 164 (2017 CEO study), 166 (CFO study), and 165–66 (combination of various studies).

F. TEMPERING AND LEAVENING INSTRUMENTALIST APPROACHES

A criticism of the STEM appellation and emphasis is that, as a result, “students don’t get a quality, well-rounded education.”⁸¹ Thomas Friedman of the *New York Times* predicts that “the best jobs in the future are going to be STEmpathy [rather than STEM] jobs—jobs that blend STEM skills (science, technology, engineering, and math) with human empathy. We don’t know what many of them will look like yet.”⁸² He laments the headlong swing toward deep immersion in STEM fields and STEM alone.

Others have offered similar critiques of the wholly instrumentalist approach education programs in the United States have taken. The No Child Left Behind from the George Bush presidency accelerates the trend, as educators focus primarily, or exclusively, on subjects that later will be tested and the results of which form the basis upon which higher-ups evaluate the teachers. Longwood University President W. Taylor Reveley IV has pointed out that many high school and university curricula no longer contain the civics courses and civics exposure that once were mandatory:

Over the past two generations, the idea of education being about teaching people how to engage in public affairs has been lost. At one point, the core curriculum at the college level was focused on: How do you get ready to be an active citizen in America? How do we make democracy endure? Today, education is thought of almost exclusively in terms of career preparation. That is what we have lost.⁸³

While astute observers may apply those observations to many educational pursuits, the comments ring especially true of the STEM phenomenon. But isn’t a near-total dedication to STEM necessary because, without it, the United States would fall increasingly behind other countries in technical subjects and later in job skills and efficiency? Information technology’s felt need to import more and more workers from India and other nations because increasingly the United States is unable to provide the workforce needed (see chapter 15) provides support for the proposition.⁸⁴

“Much of this fear stems from the biennial findings of the Program for International Student Assessment, an organization that issues a test to fifteen year olds all over the world to rank their competency in reading, math and science.”⁸⁵ The statistics are “scary:” out of sixty-five

81. Alexandra Ossola, *Is the U.S. Focusing Too Much on STEM?*, THE ATLANTIC, (Dec. 3, 2014) <https://www.theatlantic.com/education/archive/2014/12/is-the-us-focusing-too-much-on-stem/383353/> [<https://perma.cc/9YUN-DA6X>].

82. Thomas L. Friedman, *Trump Voters, Just Hear Me Out*, PITTSBURGH POST-GAZETTE, (Nov. 3, 2016) <http://www.post-gazette.com/opinion/2016/11/04/Trump-voters-just-hear-me-out/stories/201611040072> [<https://perma.cc/DVM2-NMV6>].

83. Evan Osnos, *Tim Kaine’s Radical Optimism*, NEW YORKER, Oct. 24, 2016, at 47.

84. See generally BRANSON, *supra* note 7, at chapter 15.

85. Ossola, *supra* note 80, quoting DAVID E. DREW, STEM THE TIDE: REFORMING

educational programs surveyed, the assessments ranked U.S. students twenty-seventh in math and twentieth in science.⁸⁶ “US teens lag in global education ranking as Asian countries rise to the top,” headlined an MSNBC story.⁸⁷

As in many things, all is not what it may seem. Looking deeper, Michael Teitelbaum of the Harvard Law School found that while the statistics did not lie, they failed to give a complete picture. “I found that the U.S. has always been in the middle, we’ve never been at the top.”⁸⁸ He elaborates: “I’m not saying that [other countries’] performance is irrelevant but the comparison shouldn’t be considered a direct one. Many of the countries above the U.S. in the rankings are much smaller and homogenous, places such as Singapore and Hong Kong.” He concludes, “If you take a national average across the U.S.,” as the studies do, “you have a huge disparity in educational performance across the country, even down to the local level. So you have a higher variety of educational outcomes. [Ergo] it makes sense that Americans’ average is not as high as smaller education systems.” Dr. Teitelbaum concludes, “We’re not falling back, [it’s that] some other [mostly smaller] countries are just rising.”

The alarm bells about educational outcomes, therefore, should be the one-alarm rather than the three-or four-alarm varieties that have sounded more often. The implication of that conclusion is that there is more room than previously thought for tempering or leavening the onslaught of STEM programs and STEM proposals. In turn, that finding buttresses the idea that women who aspire to leadership levels and positions in technology should delve into business subjects and attain a more well-rounded educational background.

G. ONE MORE STUDY

1. Adequacy of the Pool in Information Technology

Some evidence exists on gender diversity in upper management related to information technology. Appendix A indicates that only 5 percent of upper-level managers in information technology are women, the worst, by far, of any American industry. Taken from the compensation tables in SEC filings, the evidence is not the best. The best evidence would give us a picture of the pool as it exists deeper down in corporations, that is, the proportion of senior middle managers and lower-level senior managers who are female. They will populate the pool ten years from now, or even sooner.

Nonetheless, the evidence we do have points to the inadequacy of the pool in information technology. Together with a research assistant, I was

SCIENCE, TECHNOLOGY, ENGINEERING AND MATH EDUCATION IN AMERICA (2011).

86. Ossola, *supra* note 80.

87. *Id.*

88. MICHAEL S. TEITELBAUM, *FALLING BEHIND? BOOM, BUST, AND THE GLOBAL RACE FOR SCIENTIFIC TALENT* (Princeton University Press, 2015).

able to identify twenty-seven female executives, past and present, of publicly held information technology companies, as of the spring of 2017, as I list in appendix A. So presently the pool is only 27 out of 575, or 4.6 percent.

Before we examine the details, it is worth noting that the pool of senior-most female executives in information technology is tiny. Critics might state that the sample is so small as to be unrepresentative, statistically insignificant. But the pool's small size may be the principal message. In other words, the rejoinder to critics is that "that's all there are," a subset of 27 females in the set of 575 IT executives. The sample's minuscule size illustrates well the puny size of the pool, boding poorly for the future.

In turn, the extremely small size of the pool indicates that, unless matters take a radical turn, the number of female CEOs in IT is unlikely ever again to reach the heights, such as they are, that chapter 2 outlines (twelve women CEOs of large cap information technology companies). It further bodes ill for ascension of women to other senior posts.

2. Characteristics of the Pool

Of the twenty-seven women, only two had STEM degrees. Mary Beth Westmoreland, chief technology officer, Blackbaud (BKLB), has a degree in mathematics and physics from Immaculata University (Malvern, Pennsylvania). Debora Shoquist, executive vice president of operations, Nvidia (NVDA), has a degree in electrical engineering from Kansas State University (Manhattan, Kansas).

There were twenty-five women remaining (twenty-seven minus two who have STEM backgrounds).⁸⁹ Five of those remaining women had law degrees.⁹⁰ Four had juris doctor degrees (JDs) from elite universities (University of California at Berkeley, New York University, Georgetown University, and University of Virginia) and one from a regional university's law school (Cleveland State University). Of the twenty-five women, six had bachelor's degrees only, but all were in business or closely related fields: two in accounting, two in marketing and merchandising, one in business administration, and one in economics.⁹¹

That accounts for thirteen of the twenty-seven women in the pool overall (two STEM, five law, and six business bachelor's degrees).⁹² Paralleling the information in the previous chapter on where female CEOs come from, all of the fourteen remaining senior executive women in information technology had master's degrees in business administration (MBAs). The balance was tipped heavily in favor of prestigious colleges and universities: two from Harvard, two from Santa Clara University,

89. *See generally* BRANSON, *supra* 7, at 171–172.

90. *Id.*

91. *Id.*

92. *Id.*

followed by one each from Southern Methodist, Pennsylvania, Columbia, and California at Berkeley. Regional schools included Bentley University (Waltham, Massachusetts) and the University of St. Thomas (Houston, Texas). One MBA was foreign, from the University of New South Wales in Sydney, Australia.⁹³

3. Reading the Tea Leaves Again

Mimicking the add-back-ins of the CEO studies, one could fold the law degrees back in with the MBAs. Doing so increases the number of women in the pool with advanced business-type degrees to nineteen of twenty-seven, or 70 percent.

Doing a second add-back-in, folding the six business-oriented bachelor's degrees into the mix yields twenty-five of twenty-seven women with business rather than STEM educational backgrounds. Ninety-two percent (92.5 percent) of the women who have advanced to senior leadership positions in information technology companies have law or business degrees, not STEM backgrounds.

That number, twenty-three out of twenty-five, yields an antidote to the swirl and push behind the STEM movement, particularly as it relates to young women. But, again, we must linger here for a moment. The first thing to take into consideration is that the pool is exceedingly small. A larger pool might reveal a different outcome.

Second, one can read the evidence in other ways. Contrary to "*The Future of Tech Is Female's*" intimations, the evidence may reveal that a declining population of women has been pursuing STEM fields in their academic pursuits. Once the current STEM emphasis gains traction, more women will pursue STEM majors and eventually the pool will even out, or move toward a more even balance between STEM and business/law backgrounds.

Third, taking the opposite viewpoint, one can contend that the STEM anchor has been dragging the bottom for some time now. The evidence reveals that the best way to succeed to a leadership position in information technology is not a STEM degree but a business background or, better yet perhaps, a STEM undergraduate degree coupled with an MBA or similar advanced degree in business.

Fourth, given the pool in IT and the characteristics of the women in it, STEM emphasis should include filling the lacunae with some elemental business and economics courses, or creating and making that option available to students. Those courses or a recommended mini-track of them might be the flowers rather than the seeds of the STEM movement, advertised as such. The additional course offerings would complement the STEM platform nicely.

Fifth, to repeat the caveat set out earlier, this analysis pertains only to

93. Spreadsheets prepared by Jacqueline Jones and Michael Wikoff, Law Fellows, University of Pittsburgh School of Law (on file with the author).

those who aspire to leadership positions in information technology companies. For young women who relish STEM subjects exclusively, or for young women whose horizon stretches only to the first or second promotion, analysis of the pool is irrelevant. At most, counselors and young women should view the evidence regarding business backgrounds reservedly.

4. Leavings

The empirical finding seems impressive but is subject to a number of reservations. First, the sample overall is small—sixty-six women in leadership positions in business.

Second, based upon the finding, the contention would be that a STEM degree is best to equip a young woman to seek a position with an information technology firm and to obtain her first or even second promotion within the company. But to advance into management and leadership roles, an employee needs something additional that would give her a sense of perspective and some degree of depth in the issues that she will encounter.

Third, the further contention is that some sort of business and economics grounding suits that purpose better than heavy or straight-line STEM course sequences or majors a young man or woman could pursue.

The fourth reservation is that the sample is especially small on the STEM side. Not that many women have gone through STEM as corporations and universities presently conceive and emphasize it, and further few have matured and advanced to become eligible for leadership positions. We simply do not have sufficient raw material to postulate how a STEM background helps, or does not help, a young woman as she progresses in her career.⁹⁴

Given the research, though, simplistic as it is, I believe that a very good case may be made that STEM needs some liberalization or tempering and that the direction to be taken is toward business, economics, and perhaps a dose or two of accounting and finance. Someone far above my pay grade, Larry Page, founder and now CEO of Google, also advises this:

I think that we are not educating people in a general way. You should have a pretty broad engineering or scientific background. You should have . . . MBA training of how to run things, organize stuff, and raise money. I don't think most people are doing that and it's a big problem. Engineers [and scientists] are usually trained in a very fixed area. When you are able to think about all these disciplines together, you kind of think differently. . . . That's really an important thing for the world.

94. Cf. Kim S. Nash, *Payouts, Risks Grow for Tech Leaders*, WALL ST. J., (Oct. 8, 2015), at B-7 (A countertrend is that corporations are becoming extremely reliant upon and are promoting to officer status certain persons with deep tech backgrounds. Firms are increasing pay and status for chief information officers, or CIOs, as the position frequently is titled.).

That's how we make progress.⁹⁵

VI. CONCLUSION

In the important field of corporate governance, industry representatives, high-level corporate managers, and boards of directors should ponder a number of initiatives aimed at accomplishing increased gender diversity in management and in governance. Managers and boards should consider, for example, lessened dependence on the H-1B visa and the employment prospects the visa program produces (almost exclusively male). Those in technical industries should closely examine the headlong push toward STEM, not with a view toward eliminating or truncating it significantly but with a view to tempering it a bit. Those two items were subjects this article has explored.

The article just as well could have treated other subjects, some of which are topics of much discussion in other countries but seem to have transited toward the back burner in the United States. A partial list of possible subjects, as for example in my latest book, would include:

- Women to Try Harder: “Lean In” and Similar Recommendations
- Enactment of Mandatory Quota Laws: “[A]s recently enacted in California”⁹⁶
- Corporate Certificate and Pledge Programs
- Comply or Explain Regimes
- Mentoring with a Sponsorship Component
- Mandatory Disclosure
- Tempered STEM Education
- Attention to the Pool Problem
- Enlarging the Pool: Easing Off-Ramps and Enhancing On-Ramps for Woman (work/life issues) Measuring What You Intend to Manage and Ways to Manage It Adoption of a Version of Structured Search Requirements
- Reforming the Gaming Industry, the Gateway to Computer Science and Information Technology

Each of those subjects, of course, deserves its own article, book, books, and symposium, with lengthy discussions of the pros and cons of each and comparisons of one with the others. Those discussions, however, to paraphrase Scarlett O’Hara from *Gone with the Wind*, are for a future time and place, because “[a]fter all, tomorrow is another day.”

95. ASHLEE VANCE, *ELON MUSK: TESLA, SPACEX, AND THE QUEST FOR A FANTASTIC FUTURE*, 355–56 (Harper Collins Publishers, 2015) (quoting Larry Page, founder and now CEO of Google).

96. See Yoree Koh, *The Quest for Women Directors: California Now requires Public Companies to Have at Least One Female Board Member*, WALL ST. J., (Nov. 13, 2018), at R-10. See also Joseph Grundfest, *Mandating Gender Diversity in the Boardroom: The Inevitable Failure of California’s SB 826*, Working Paper No. 232, Rock Center for Corporate Governance, Standord University (Sept. 12, 2018).

APPENDIX*Women Senior Executives in Publicly Held Information Technology Companies*

Company	Name	Position	Terminal Degree
1. Akami	Melanie Haratunian	Exec. VP	JD, Georgetown
2. Alliance Fiber	Anita Ho	CFO	BA (Accounting), Soochow Univ.
3. Analog	Eileen Wynne	Controller	MA (BS, Accounting), Bentley Univ.
4. Apple	Angela Ahrendts	VP, Retail	BA (Marketing), Ball State
5. Apptio	Susanna Morgan	CFO	MBA, Harvard
6. Autodesk	Jan Becker	Human Resources	BS (Business Administration), San Jose Univ.
7. Blackbaud	Mary Beth Westmoreland	CTO	BS, Immaculata
8. Broadcom	Patricia McCall	Gen. Counsel	JD, Virginia
9. CA	Lauren Flaherty	CMO	BA (Marketing), Syracuse
10. Cisco	Rebecca Jacoby	VP, Operations	MBA, Santa Clara
11. Cognizant	Karen McLoughlin	CFO	MBA, Columbia
12. Concurrent	Davina Furnish	Gen. Counsel	JD, Cleveland State
13. Facebook	Sheryl Sandberg	COO	MBA, Harvard
14. Fireeye	Alexa King	Gen. Counsel	JD, Cal Berkeley
15. Google	Ruth Porat	CFO	MBA, Pennsylvania
16. H-P	Catherine Lesjak	CFO	MBA, Cal Berkeley
17. H-P	Marie Myers	Controller	MBA, St. Thomas
18. Intel	Paula Tolliver	CIO	MBA, Babson
19. Juniper Networks	Robyn Denholm	CFO	MBA, New South Wales
20. Microsoft	Amy Hood	CFO	MBA, Harvard
21. Nvidia	Colette Kress	CFO	MBA, SMU
22. Nvidia	Debora Shoquist	VP, Operations	BS EE, Kansas State
23. Proofpoint	Tracey Newell	VP, Sales	BA (Economics), Santa Barbara
24. SanDisk	Judy Bruner	CFO	MBA, Santa Clara
25. Square	Sarah Friar	CFO	MBA, Stanford
26. Twitter	Vijaya Gadde	Gen. Counsel	JD, NYU
27. Zendesk	Amanda Kleha	Senior VP	MBA, Yale