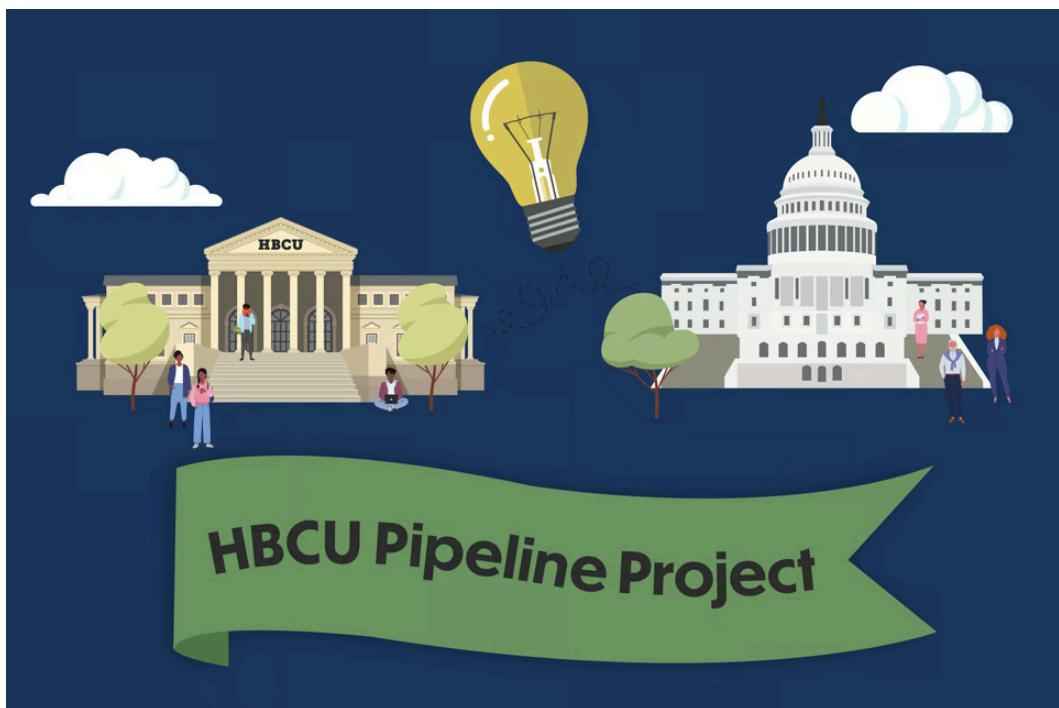


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The Patent Promise: Enhancing Diversity in Innovation

Sandra K. Johnson, Ph.D.



Takeaways

Patents can be a significant asset for entrepreneurs to achieve success in the marketplace and in seeking funding for growth. However, little definitive information exists on the participation of women and people of color in the patent process and the intellectual property ecosystem. The data we do have indicate women make up just 12.8% of US inventors and US-born minorities represent just 8%, revealing that these communities are vastly underrepresented among inventors and face obstacles to accessing this vehicle of personal and commercial success.

The Industrial Revolution has been viewed as one of the most innovative eras in global history. And for much of that history, the United States has led the way in creating new industries and ways of doing business. Yet, recently, the United States slid behind other countries in patent filings and scientific publishing.[#] If the United States wants to regain its standing as the world's global leader in innovation, it must look to underestimated communities like women and people of color.

For more than a decade, researchers have shown that women, minorities, and people from low-income communities seek and secure patents at significantly lower rates than their male, white, and wealthier counterparts.[#] The latest data compiled by the US Patent and Trademark Office (USPTO) shows that women account for less than 13% of inventors, despite being half of the population and a rapidly growing segment of entrepreneurs.[#] Available data on patent applicants is so scarce that the agency was unable to present findings on the standing of racial or ethnic groups within the innovation economy.

In this report, I uncover why cracking the patent-making process and encouraging more participation among these groups can expand personal and commercial opportunities for entrepreneurs and bolster American technological leadership.

A Competitive Advantage

Innovation drives businesses and economies forward. For countries, it provides a key competitive advantage on the global stage. For businesses, it can result in a highly desirable and marketable product or service. Individuals working in environments conducive to creativity can innovate and develop unique ideas that may warrant intellectual property protection via patents. A US patent is an asset that “grants its owner the right to exclude others from manufacturing their invention (or practicing their patent).”#

Patents not only have the potential to provide financial success and esteem for inventors, they also open “opportunities for access to capital, innovation monetization, and growth for startup companies.”# For example, some of the reasons startup companies pursue intellectual property protection via patents include:

- **Value creation.** A company’s patent portfolio increases its value. It is attractive for potential investors and increases its acquisition value. In addition, many large companies seek new and innovative technologies from startups and are willing to pay top dollar. Patents build a strong business asset component that is critical for a new venture.
- **Revenue potential.** Patent exclusivity enables the generation of revenue in several ways. Businesses can generate revenue on the product or service developed based on the invention. A business can also secure licensing agreements to generate a stream of income. Another viable option is cross licensing agreements. This requires the company to have issued patents, which may take 2-5 years. Once obtained, the business can secure agreements with entities interested in using the patent, and vice versa. Revenue may not be exchanged, but a company may use a key innovation at little or no cost.
- **Defensibility.** A patent gives startups a competitive market advantage. It prevents others from providing the same product or service. It also becomes a barrier for others to enter the market with the same invention for up to 25 years from the date of patent application filing, subject to the payment of maintenance fees.

Understanding Patent Holder Diversity

During the height of the Industrial Age, the percentage of Blacks living in the North who were awarded patents equaled their percentage of the US population.# In recent years, the number of diverse patent holders has been trending exceptionally lower. A study found that from 1970 to 2006, African American inventors were awarded just 6 patents per 1 million people, compared to 235 patents per 1 million for all US inventors.# According to a now-dated study by the Information Technology and Innovation Foundation, US-born minorities (including Asian Americans, African Americans, Hispanics, Native Americans,

and other ethnicities) represent just 8% of U.S.-born innovators.[#] Among women, there were just 40 patents awarded per 1 million from 1970 to 2006.[#]

There are many reasons why there is an underrepresentation of women and minority inventors. Some of them include:

- **STEM underrepresentation.** A Pew Research Center study found that Hispanic workers are 17% of the US workforce but only 8% of STEM workers. Also, Black workers are 11% of the US workforce and only 9% of STEM workers. According to a study from the National Center for Educational Services, a 2016/17 study showed that “women are proportionately half as likely to major in math, computer science, engineering and technology as compared with men.”[#]
- **Lack of awareness.** Many members of these constituencies are unaware of what is required to obtain a patent or the specifics of the patent application process.
- **Insufficient funds.** The average cost for filing a utility patent application is approximately \$12,000, while the total costs of obtaining a patent, on average, is about \$50,000.[#]
- **Lack of visible role models.** While there are many female and minority inventors, most are not visible to encourage and inspire a critical mass of aspiring entrepreneurs.

Even when underrepresented groups do seek to establish a patent, they often face discrimination when their background is revealed. A study by Yale researchers suggests that when gender is shared with patent examiners, women are systematically less likely to receive an award. The patents themselves were also narrower in scope, limiting the ability of an entrepreneur or inventor to pursue fraudsters.[#] Underestimating inventors in this way has driven many universities and private sector companies to establish their own resource centers and training programs.

Case Studies: North Carolina A&T and Google/Cardozo School of Law

For example, North Carolina A&T State University (NC A&T), through its Center for Excellence in Entrepreneurship and Innovation (CEEI), is working to address this innovation gap with its Intellectual Property (IP) Clinic. Officially launched in October 2021, the clinic is designed to foster a collaborative environment of innovation, entrepreneurship, invention, and creativity throughout the campus. Its objective is to help students and employees transform their innovations into IP assets that can benefit their entrepreneurial path.

IP Clinic activities include:

- **Webinars and workshops.** The Clinic expands its clients' networks by hosting talks with successful IP attorneys, patent brokers, innovators and entrepreneurs, and inventors of color. Example topics include *How to Seek IP Protection for your Startup* and *How to File a Patent Application*.
- **IP office hours.** Students, faculty, and staff that have an idea that may be patentable are invited to meet with subject matter experts one-on-one. Together they assess the patentability of their high-level ideas and discuss how to initiate the patent process.
- **Training sessions.** Volunteers at the IP Clinic are pulled in part from faculty, staff, and students who've been trained on IP. Advanced classes are offered for certain cases (e.g., design classes) where filing a provisional patent application is appropriate.
- **NCAT patent fund.** A fund for students was created to encourage them to file a provisional patent application by nominally funding their initial application. Students are required to attend patent webinars, conduct a due diligence search, receive feedback, and write a draft provisional patent application prior to applying and being selected for funds.

One other example is the public-private partnership between Google and the Cardozo School of Law in New York City that is aimed at expanding patent inclusion. Google awarded Cardozo a grant in 2017 to launch the [Patent Diversity Project](#), a program designed to close the patent gap by providing free legal assistance to inventors who have historically been underrepresented, including women and people of color.[#] According to their research, less than 8% of issued patents name women as the primary inventor, and Black inventors file for patents at one-third the rate of white inventors.[#] The Project helps entrepreneurs and inventors address funding issues that are typically a significant barrier to the patent process. It also provides educational materials and programming to raise awareness about the patent process and its requirements. In October of 2021, the Project secured its first patent on behalf of Rose Coppee, a Black inventor, for her modular hairbrush. She was able to receive pro bono services and expert guidance to navigate the patent examination process. Now she is pursuing another patent in her field of health care. Her experience with the Patent Diversity Project and its partners made the entire process less intimidating, saying “when you do it once, you’re not afraid anymore.”[#] Furthermore, many law schools and the USPTO have IP clinics designed to assist inventors with filing patent applications.

What Can Policymakers Do?

While solutions can come from academia and the private sector, there are significant steps federal policymakers can take to encourage greater inclusion in the patent ecosystem. Some of those policies include:

Better measure contributions from women and minorities. The USPTO has little data on women and minority inventors. The Agency's latest data, which found that just 13% of all inventors are women, was collected with an algorithm that infers gender based on an applicant's name. They were not able to obtain similar metrics for Black inventors and those of other ethnicities. Measuring the contributions of women and minorities to the innovation economy is central to improving our understanding of why these groups are still underrepresented. Last year, a bill that would direct the USPTO to gather demographic data on a voluntary basis from patent applicants passed the Senate Judiciary Committee. The bill would also keep this information private and inaccessible to examiners who are responsible for issuing patents in an unbiased fashion. This legislation can help researchers and policymakers characterize who participates in the patent ecosystem and identify opportunities that will expand participation.

Start upstream. A study by researchers at Harvard, MIT, and the Treasury Department found that exposure to innovation before children enter the labor market substantially increases the likelihood they will pursue patents and become inventors later in life. They also found that children at the top of their class in math and science are only more likely to become inventors if they come from high-income families.[#] Wealthy and well-connected families can offer their children greater access to innovators; that opportunity for networking and mentoring are important factors in a child's trajectory. Policies can level the playing field by targeting high-performing mathematics and science students from underrepresented backgrounds with educational programming and outreach about patents.

Educate the public. When surveyed, entrepreneurs often cite a general lack of understanding of intellectual property rights and the patent system. Policymakers can invest in programs that promote the entrepreneurial advantages of patents and develop awareness of the patent application process. Using the network of Historical Black Colleges and Universities as anchor institutions for public education campaigns could boost innovation on campus and in surrounding communities. The campus programs can connect students with mentors, supply funding, and increase the visibility of Black and female inventors. Many entrepreneurs avoid the patent-making process due to misinformed perceptions about its complexity. At the NC A&T Clinic, we've found that once the initial mystery subsides, patent holders find themselves coming back to the system and pursuing the protection of more of their inventions.

Make it easier to file. Policymakers can also adopt innovative methods to make filing patent applications easier for all inventors, including minorities and women. The current

process is complex and often requires a specialized attorney or agent to prepare an application, which for many is cost prohibitive. Providing funding assistance for patent applications as well as developing new and easier ways to file could boost applications. But increasing applications from underrepresented communities is just the first step. Moving those applications throughout a streamlined process that is both thorough and fair is critical to ensuring more qualified individuals obtain awards. The legal and cost barriers to the filing process have incentivized some inventors to file *pro se* and the resulting applications are of poor quality and less likely to be approved.[#] Reducing these barriers by streamlining examination, incorporating innovative filing methodologies, and providing assistance could increase the quality and success of patent applications.

Patents can be a significant asset for entrepreneurs to achieve success in the marketplace and in seeking funding for growth. Historically, it has been a catalyst for driving innovation to marketplace success. However, the limited numbers of Black and other underrepresented inventors may be an obstacle for marketplace success for these constituents. Closing this gap, based on the example programs and the proposed policies, will increase the likelihood of marketplace success for these entrepreneurs.

About the Author: Sandra K. Johnson is the Founder & CEO of Global Mobile Finance, Inc., a fintech startup company in Research Triangle Park, North Carolina. She is also the Founder of SKJ Visioneering, LLC, a technology consulting company, and an Independent Director on the Board of Directors for Regional Management Corporation (NYSE:RM). She previously worked as a Visiting Scholar at North Carolina A&T State University, where she established its IP Clinic as part of the Center for Excellence in Entrepreneurship and Innovation. She had a 26-year IBM career and is a Master Inventor with over 45 pending and issued patents. Dr. Johnson earned B.S., M.S., and Ph.D. degrees in electrical engineering from Southern University, Stanford University, and Rice University, respectively. She is a Fellow of the Institute of Electrical and Electronics Engineers, and the first African American woman to earn a Ph.D. in electrical and computer engineering.
