Gender and Racial Diversity in Invention & Patenting

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Study Director
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A just future begins with bold ideas.

As a leading national think tank, IWPR builds evidence to shape policies that grow women’s power and influence, close inequality gaps, and improve the economic well-being of families.
Lessons from Research: Diversity in Patenting, Innovation & Entrepreneurship

- What do we know? Data on gender diversity
- Patenting Gaps: Implications for Women Entrepreneurs
- Lessons from Women’s Experiences
- Programs Promoting Equity & Inclusion
- Recommendations/Next Steps
Women & Patenting Data: The Need for Faster Progress
Slow Progress on Women’s Share of Patents

Gender Parity in Patenting Will Not Be Reached for a Century

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Innovation and Intellectual Property among Women Entrepreneurs
Women-Owned Businesses are Growing and Most of This Growth Has Been Driven by Women of Color

Number and Share of Firms by Gender and Ownership, 1997-2015

<table>
<thead>
<tr>
<th>Year</th>
<th>Women-Owned</th>
<th>Equally-Owned</th>
<th>Men-Owned</th>
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<tbody>
<tr>
<td>1997</td>
<td>847,000</td>
<td>1,029,000</td>
<td>3,151,000</td>
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<td>2002</td>
<td>916,657</td>
<td>717,961</td>
<td>3,524,969</td>
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<td>2007</td>
<td>999,661</td>
<td>1,050,232</td>
<td>3,230,075</td>
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<tr>
<td>2012</td>
<td>1,035,655</td>
<td>764,977</td>
<td>3,335,572</td>
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<tr>
<td>2015</td>
<td>1,088,466</td>
<td>769,446</td>
<td>3,387,196</td>
</tr>
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</table>

Percent of all firms owned by women:
- 1997: 16.8%
- 2002: 17.7%
- 2007: 17.5%
- 2012: 19.7%
- 2015: 20.8%

Note: Data for each year include nonfarm businesses with paid employees other than the owner and receipts of at least $1,000. Business ownership is defined as owning at least 51 percent of the stock or equity in the business.
**Women-Owned Businesses are Less Likely than Their Male-Owned Counterparts to Own Intellectual Property Rights**

Share of Women- and Men-Owned Businesses with Intellectual Property Holdings, 2015

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<th></th>
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<tbody>
<tr>
<td>Patent (pending)</td>
<td>0.4%</td>
<td>0.9%</td>
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<tr>
<td>Patent (granted)</td>
<td>0.7%</td>
<td>1.5%</td>
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<tr>
<td>Copyright</td>
<td>4.3%</td>
<td>4.5%</td>
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<tr>
<td>Trademark</td>
<td>6.1%</td>
<td>7.0%</td>
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<tr>
<td>At least one IP holding</td>
<td>8.8%</td>
<td>9.7%</td>
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Note: Includes nonfarm businesses with paid employees and receipts of at least $1,000. Business ownership is defined as owning at least 51 percent of the stock or equity in the business. Percentages may not add to totals because firms may hold more than one type of intellectual property.

Women-Owned Businesses Have More Limited Access to Start-Up Capital

Women- and Men-Owned Firms by Amount of Start-up Capital, 2015

<table>
<thead>
<tr>
<th>Amount of Start-up Capital</th>
<th>Women-Owned</th>
<th>Men-Owned</th>
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<tbody>
<tr>
<td>Less than $5,000</td>
<td>18.3%</td>
<td>14.7%</td>
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<tr>
<td>$5,000 to $9,999</td>
<td>9.4%</td>
<td>8.4%</td>
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<tr>
<td>$10,000 to $24,999</td>
<td>12.2%</td>
<td>12.1%</td>
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<tr>
<td>$25,000 to $49,999</td>
<td>10.3%</td>
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<td>$50,000 to $99,999</td>
<td>9.7%</td>
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<tr>
<td>$100,000 to $249,999</td>
<td>9.5%</td>
<td>5.6%</td>
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<td>$250,000 to $999,999</td>
<td>5.5%</td>
<td>6.9%</td>
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<tr>
<td>$1,000,000 to $2,999,999</td>
<td>1.6%</td>
<td>0.9%</td>
</tr>
<tr>
<td>$3,000,000 or more</td>
<td>0.3%</td>
<td>0.7%</td>
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Note: Includes nonfarm businesses with paid employees and receipts of at least $1,000. Business ownership is defined as owning at least 51 percent of the stock or equity in the business.

Women-Owned Businesses That Have A Patent Pending Have Average Revenues > 16x Higher Than Those Without IP Holdings

Average Sales and Receipts per Firm, by Type of Intellectual Property Holding and Gender of Ownership, 2015

Note: Includes nonfarm businesses with paid employees and receipts of at least $1,000. Business ownership is defined as owning at least 51 percent of the stock or equity in the business. Firms may own one or more than one type of intellectual property.\(^a\)

Tackling the Gender and Racial Patenting Gap to Drive Innovation: Lessons from Women’s Experiences
Methodology

• 21 in-depth interviews with 16 women (11 women of color) and 5 men inventors.
• Interviews were conducted with participants that spanned a wide range of industries, geographical locations, ages, and stages of career.
• Interviewees discussed experiences patenting in academia, corporations, and entrepreneurial endeavors.
Systemic Barriers to Innovation & Patenting

• Stereotypes, discrimination, and bias were discussed by every woman inventor.

• Women of color face additional race-gender biases and are often the “only” in the room.

• Women’s underrepresentation in STEM and patent-intensive fields.

• Women continue to face structural barriers in the workplace.
Lack of Formal Education Adversely Impacts Women

- Zero inventors received formal education on patenting or innovation.
- Women reported not understanding what constituted an invention.
- Women reported a lack knowledge about where to go for information on patenting.
- Women said they were often confused about the basics of the patenting process.

“I knew nothing about the patent space; I knew nothing about what to do with your ideas. I didn’t even know that academics patented their ideas.”

—White woman, academia
Informal Education & Mentorship is Crucial

• The lack of formal education make mentors and support networks the main source of knowledge about the patenting system.

• Finding mentors and support networks is more difficult for women inventors: 14 of the 16 women reported having to work harder to find resources, networks, and mentors.

“I feel like I had a lot of support throughout the years, but I had to find that and I had to look for all the opportunities. It wasn’t, like, things just magically just came to me... I really had to go out of my way to learn and then get opportunities for myself.”

—Latina woman, corporate
Gatekeepers Matter

• Women benefit from sponsors who are “in the room” to actively advocate for patent authorship and other opportunities.
• Patent attorneys can be a crucial support or a major barrier.
• Technology transfer offices take the burden of time and money off academic inventors, but can make it difficult for new academics to utilize their resources.
Challenges & Supports Differ by Sector

Academia:
• Limited opportunities to benefit financially
• Patenting not given the same “weight” as academic papers.

Entrepreneurship:
• Funding: Women are less likely to have the capital needed to patent and commercialize their ideas.

Corporate:
• Understanding office politics is crucial for new women inventors.
• Finding mentors and building networks beyond immediate supervisors is key to success.

“I think female technologists...have a lot of tendencies to think, ‘Well, I’m just going to do good work and my line manager will make sure that whatever needs to happen happens’— not realizing that there’s this whole other system, whole other set of relationships and conversations that have to take place, that the individual has to take the initiative to start the conversation and to stick with it.”

—White woman, corporate
Lessons from Women

• While some women feel they have gained personally from patenting, others feel the challenges outweighed the benefits.

• Women face numerous barriers to patenting that their male counterparts do not experience.

• At the intersection of gender and race, women of color face additional barriers in patent-intensive fields.

• Tackling the gender and racial patenting gaps will take a concerted effort from a wide range of individuals and organizations, including academic institutions, companies, and policy-makers.
Closing the Gender Gap in Patenting, Innovation, and Commercialization: Programs Promoting Equity & Inclusion
Program Development & Design

- Building Relationships to Address Inequality
  AWARE, U of Illinois, Urbana-Champaign

- Building Networks to Change an Ecosystem
  BioSTL’s Inclusion Initiative

- Creating a Dedicated Space for Women
  EWITS®, University of Florida
Program Development & Design

- Accelerating Change through Young Women
  MyStartupXX, Univ. of California San Diego

- Pairing Education & Network Building
  REACH for Commercialization™, Ohio State University

- Providing One-on-One Support
  Phase 0 Assistance Program, US DOE

- Virtual Resources & Addressing Investor Bias
  STEM 2 Market, AWIS
Strategies for Promoting Women’s Participation & Success

- Information Sharing & Education
- Network Building & Mentorship
- Changing the Culture
- Tracking the Outcomes
Recommendations & Next Steps
Recommendations for Programs

Identify & Understand the Target Audience

Define the Scope of Work

Build Relationships with Key Stakeholders
Recommendations for Organizations/Companies

- Invest in research.
- Conduct internal analysis including collecting demographic data.
- Tackle systemic racial and gender bias and discrimination.
- Invest in child care and work-life balance supports.
- Increase access to quality patent attorneys.
- Increase support and funding for accelerator programs for women.
Recommendations for Policymakers

- Invest in & support research, including collecting demographic data.
- Tackle systemic racial and gender bias and discrimination.
- Invest in & support early exposure to STEM and innovation programs.
- Develop formal curricula on patenting for use in public schools.
- Pass policies that support working women.
- Increase access to quality patent attorneys – expand the USPTO pro-bono programs.
- Increase flexibility in governmental grant funding.
- Increase support and funding for accelerator and other programs for women.
- Increase funding for women, particularly for women of color, for innovation, patenting, and entrepreneurship.
Recommendations for Individuals

Get involved

• Find and join local programs, networks, and initiatives.
• Bring this issue up at work – especially if you have access to leadership.
• Join policy and advocacy efforts.