

Diversity in Innovation TOOLKIT

Developed by
The IPO Women in IP Committee

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This paper was created by the authors for the Intellectual Property Owners Association Women in IP Committee to provide background to IPO members. It should not be construed as providing legal advice. Document contains links; please Ctrl + click underlined text to access.



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ELEVATOR SPEECH

Over 53% of PhDs are awarded to women.

Yet, only 12% of recognized innovators in the United States are women.¹

Women and diverse employees have technical skill and knowledge, yet their contributions are not patented at the same rate as those of their male counterparts. These statistics suggest that our organizations may not be capturing the full contribution of a large segment of our technical workforce - resulting in significant lost opportunity costs (e.g., unpatented inventions, delayed disclosures, etc.). The insights and perspectives of women are necessary to solve the monumental challenges our organizations face. This toolkit can help organizations move the needle on achieving gender parity in innovation.

Document contains links; please Ctrl + click underlined text to access.

¹ National Science Foundation Statistics

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INTRODUCTION

The United States Patent and Trademark Office's recently issued Progress and Potential Report finds that in 2016 fewer than 12% of all patent inventors were women.² The Institute for Women's Policy Research predicts that, without a concerted effort to change course, it will take until the end of this century to reach gender parity in innovation.³ That literally means that it will take another lifetime to achieve innovative gender parity.

Why does this matter? In many technical fields, patents are linked to promotion and salary increases, so gender disparity in patent application filings and issuances can correlate to gender disparity in advancement and salary within an organization.

Patent activity is also a key metric for venture capital funding,⁴ so gender disparity in patent application filings may correlate to gender disparity in financial support of entrepreneurial activity. Increasing the number of women filing patent applications may help increase the funding to women's entrepreneurial activity.

From an organization's point of view, leaving innovations unpatented equates to lost economic value. Further, empirical studies have found that even though women patent less than men, the quality and impact of their patents are equal to or exceed those of men.⁵ From a societal view, as the PTO stated in its report, "if women, minorities, and low-income children were to invent patented technology at the same rate as white men from high-income households, the rate of innovation in American would quadruple."⁶

Data shows that innovative gender parity is better in academic institutions than in the business sector,⁷ but patents generated by universities form a small percentage of granted patents because about 85% of all patents are awarded to

[2] Office of the Chief Economist, U.S. Patent & Trademark Office, Progress and Potential: A Profile of Women Inventors on U.S. Patents (2019), <https://www.uspto.gov/sites/default/files/documents/Progress-and-Potential.pdf>.


[3] The Institute for Women's Policy Research, Briefing Paper: The Gender Patenting Gap, July, 2016.

[4] Graham, Stuart, J.H., Robert P. Merges, Pam Samuelson, and Ted Sichelman, High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkley Patent Survey, Berkeley Technology Law Journal, 24(4) (2009).

[5] McMillan, G., Gender Differences in Patenting Activity: An Examination of US Biotechnology Industry, Scientometrics, 80, 683-691 (2009).

[6] Office of the Chief Economist, U.S. Patent & Trademark Office, Progress and Potential: A Profile of Women Inventors on U.S. Patents (2019), <https://www.uspto.gov/sites/default/files/documents/Progress-and-Potential.pdf>.

[7] World Intellectual Property Organization, Economic Research Working Paper No. 33, Identifying the Gender of PCT Inventors, November 2016.



for-profit companies.⁸ In order to see meaningful improvements, corporations must play a leading role in effecting cultural change to emphasize and reward diversity in innovation.

Gender disparity is not simply a leaky pipeline issue. Pipeline and leaky pipeline issues are rarely the sole root cause of gender disparity. Increasing the pipeline will help, but it is unlikely to resolve all gender parity issues. Further, it takes time to fill the pipeline and maintain the flow.

The Intellectual Property Owner's Association ("IPO") and the Women in IP Committee ("WIP") got involved after the World Intellectual Property (WIPO) report showing that slightly less than 30% of PCT applications listed at least one female inventor.

The Women Inventors Subcommittee (of the WIP) was formed to address these issues. The goal of IPO and WIP is to bring awareness to the issue of gender disparity in innovation and to offer tools to assist IPO member organizations to bring awareness and move toward gender parity in innovation. In June 2018, the IPO Board of Directors approved an alpha version of the Toolkit, and in July 2018, several companies and organizations agreed to test the Toolkit and provide feedback. During the second half of 2018, additional companies and organizations expressed interest in the Toolkit and agreed to test it and provide feedback. In early 2019, the WIP sought feedback from the companies and worked on a beta version of the Toolkit. In May 2019, the IPO Board of Directors approved the beta version, providing approval for a launch concurrently with the 2019 Annual Meeting.

[8] National Science Foundation, Science and Engineering Indicators 2018, available at <https://nsf.gov/statistics/2018/nsb20181/report/sections/invention-knowledge-transfer-and-innovation/invention-united-states-and-comparative-global-trends>.

Using the Toolkit, and ultimately improving gender parity in innovation within an organization, has many benefits. Some of the benefits include: helping to stem the flow of the leaky pipeline (or fill the pipeline with new inventors); helping to create an inclusive culture within the organization where the innovative ideas and contributions of female and diverse employees sought after and valued; and helping to bring greater value to organizations. Simply put, gender parity in innovation is imperative for the nation's innovation policy and global competitiveness.

We hope that you find this toolkit useful and that you are willing to share your input and ideas on how to improve the toolkit with us. We are always looking to improve upon the toolkit, and we are stronger and better when we have more ideas included in the toolkit. So, please contact us to provide input, brainstorm, or find ways we can partner on this important issue.

Sandra Nowak & Michelle Bugbee

Co-chairs of the Women Inventors
Subcommittee of IPO Women in IP
Committee

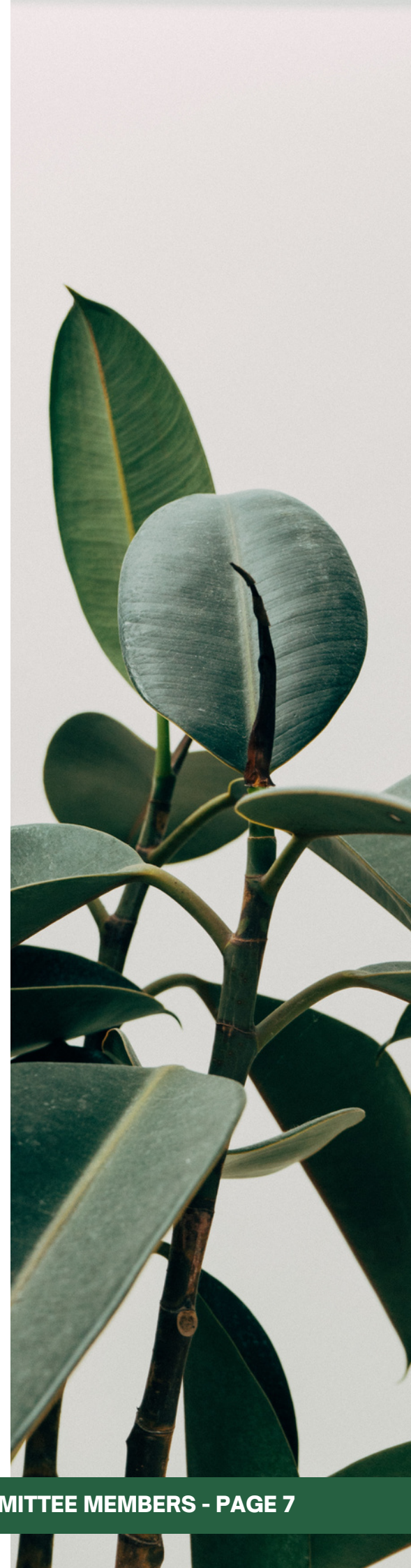
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DID YOU KNOW?

The *dishwasher* was invented by Josephine Cochrane, a wealthy socialite who owned expensive heirloom china. She measured all her dishes and made her compartments for each that sat atop a motor-powered wheel above a boiler.





HOW TO USE THIS TOOLKIT

WHO: This toolkit can be used by any organization, including, for example, corporations and universities, to improve their gender parity in innovation. It can be used by Intellectual Property (“IP”) Professionals, Research & Development (“R&D”) leaders, Human Resources (“HR”) professionals, and/or Diversity & Inclusion (“D&I”) professionals.

HOW: The toolkit is best used by understanding the 4-step process highlighted on pages 9 to 11. Then reading through and tackling each of those steps in turn within your organization. We have provided sample communication and other documents so that your valuable time can be spent working on the issues in your organization rather than creating new documents from scratch. The samples provided are solid drafts for your use in efficiently creating documents that best address your specific organization.

WHEN: When you’ve read through or used the toolkit, please send your feedback and any information you are willing to share about your organization. We do not attribute anything to any specific organization unless asked to do so, so any input will remain confidential and will help make the toolkit stronger and better for other organizations also working on this issue.

Gender Parity in Innovation 4-Part Cycle

Gender Parity in Innovation Process

Step 1 - Increase Awareness & Support

Raising awareness and internal support is an essential first step in making significant change within an organization. Increasing awareness is important in all organizations, but is especially important for those having leaders and/or employees that are largely unaware of gender disparity in innovation and are devoting little effort to addressing this issue. Awareness and support should be an ongoing, regular activity.

Ongoing

Step 2 - Discover Root Causes

Organizations that are most effective at implementing change are those that spend time up front assessing the key root causes for their current state. As such, organizations that devote time to understanding the causes for their gender disparity will be able to address those specific root causes with targeted programs and thereby be more effective at implementing systemic, long-term change.

Step 3 - Develop Short- and Long-Term Programs

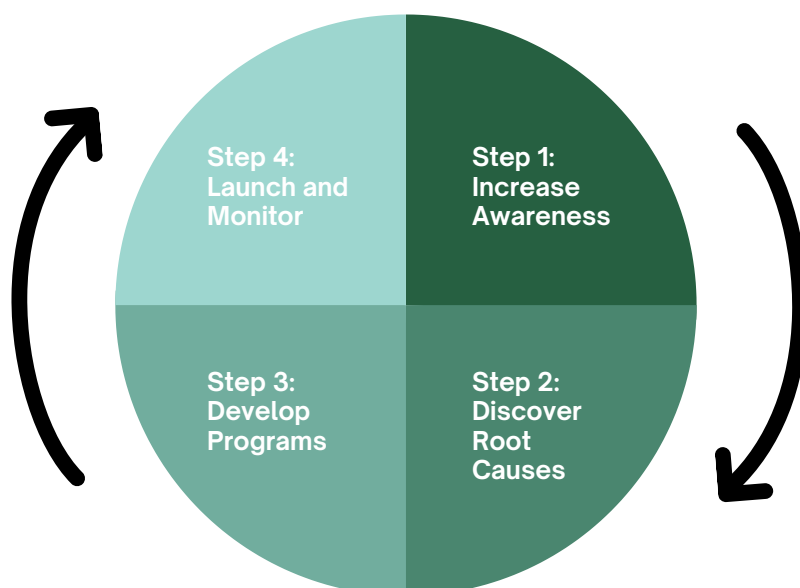
Once root causes are identified, organizations should develop a mix of short-term and long-term programs that address the specific root causes identified in step 2. This section is organized by root cause identified and within each root cause chapter suggests short-term and long-term programs that other organizations have found effective at addressing the specific root cause.

Step 4 - Launch & Monitor the Programs

This portion of the toolkit focuses on ideas for successful program launch as well as suggested metrics and/or monitoring activities that will enable an organization to measure the success or progress of the gender diversity programs/efforts. This section also provides tips for when and how to go back to steps 1 and 2 routinely to raise awareness and support and to see if new root causes (or unexplored root causes) develop.

Importantly, the 4 steps above are not performed only once, but rather are iterative. In other words, the steps are circular rather than linear, as shown in the graphic below:

4-Part Cycle



A description of each of the 4 steps is below:

- **STEP 1 –Increase Awareness & Support**

Raising awareness and internal support of gender disparity in innovation is an essential first step in making significant change within an organization. Increasing awareness is important in all organizations, but is especially important for those having leaders and/or employees that are largely unaware of gender disparity in innovation and are devoting little effort to addressing this issue. Awareness and support should be an ongoing, regular activity.

- **STEP 2 –Discover Root Causes**

Organizations that are most effective at implementing change are those that spend time up front assessing the key root causes for their current state. As such, organizations that devote time to understanding the causes for their gender disparity will be able to address those specific root causes with targeted programs and thereby be more effective at implementing systemic, long-term change.

- **STEP 3 –Develop Short- and Long-Term Programs**

Once root causes are identified, organizations should develop a mix of short-term and long-term programs that address the specific root causes identified in step 2. This section is organized by root cause identified with suggested short-term and long-term programs that other organizations have found effective at addressing each specific root cause.

- **STEP 4 – Launch & Monitor the Programs**

This portion of the toolkit focuses on ideas for successful program launch as well as suggested metrics and/or monitoring activities that will enable an organization to measure the success or progress of the gender diversity programs/efforts. The metrics and monitoring activities will also enable organizations to identify and augment programs that produce superior results, as well as share these results with other organizations through the toolkit. This section also provides tips for when and how to routinely go back to steps 1 and 2 to raise awareness and support and to see if new root causes (or unexplored root causes) develop.

DID YOU KNOW?

The *liquid paper* was invented by Bette Nesmith Graham, a single mother working as a secretary at a bank. She came up with the idea of creating a liquid to cover up her typing mistakes.



Chapter 1 (Step 1)

INCREASING AWARENESS AND SUPPORT

The goal of this step is to increase awareness and support of the issue of diversity in innovation within your organization.



CHAPTER OUTLINE:

- Section 1: Initial Executive Level Awareness and Support

- Who to Involve
- What to Say
- What is the “Ask”

- Section 2: Initial Employee Awareness and Support

- Target various groupings of employees repeatedly

- Section 3: Ongoing Organization-wide Awareness & Support

- Organization-wide spotlights
- Social Events / Celebrations

- Section 4: Curated List of Articles on the Topic of Gender Disparity in Innovation and Diversity in Innovation

Chapter 1. Section 1: Executive Level Awareness and Support

Executive engagement is critical and essential for success. This section of the toolkit provides information on who to initially involve, what to say, and what to ask for to drive executive-level support at the beginning of this initiative.

Who to Involve:

All organizations are different so determine what works best for your organization. Some possibilities to consider include: Chief Diversity and Inclusion Officer, Sustainability Officer, Chief IP Counsel, Chief Technical Officer, Technical Directors, Lab Managers, HR professionals, and Business Executives. In many instances, no more than 5 people (aside from you) may be best to facilitate an open dialogue on the issue. If possible, include at least one person who can drive a cultural change within your organization, either through position or personality (preferably both).

What to Say

You know your team best, so use your best judgment. Some materials to consider include those linked in the box on the right.

Organizations vary, so make these pitches your own. Please send any suggestions for modifications or testimonials of what worked for your organization. Additionally, reference the curated articles/publications list at the end of this section to help you generate your discussion outline and presentation materials.

What to Say Sample Materials:

[Elevator Speech](#)

[Sample 1: Pitch Materials](#)

The first question from many executives is: do we have an issue here at this organization, and what are the statistics for this company/ university? One way to answer that question is to obtain the [WIPO gender diversity data](#) (or other similar data) for your organization. The WIPO gender diversity data provides the total number of PCT applications filed and the % of these PCT applications with at least 1 female inventor in the previous year. If you are an IPO member, you can get this information by emailing [Hannah Denny](#) at IPO.

Another way to answer this question is to run the [publicly available WIPO algorithm](#)⁹ that assigns a gender to a name and run that algorithm on your organization's data to determine the gender breakdown of inventors.

Consider whether your organization should additionally or alternatively gather gender disparity data specific to them. To be clear, this is not a required step, as macroscopic data is available for most organizations using the methods identified above. However, some companies do not believe the PTO or WIPO data unless they gather it themselves. Gathering this data for a large, global organization can be both time-consuming and challenging (given varying HR rules globally). Many organizations do not routinely track gender of inventors in docketing databases.

For companies/universities who choose to gather their own data, some best practices that have met with successes include the following:

[9] Please see WIPO algorithm in footnote 4 of Working Paper No. 33.

- Run the publicly available gender-name association algorithms on your organization's data.
- Contact your HR department. Many HR organizations have an employee database in which employees designate their preferred gender. If you provide HR with a list of employees, they can often generate a report summarizing high-level information for use in your diversity in innovation assessment.
- Assign or hire someone in your organization to go through the inventor data for your organization in a given timeframe and identify each inventor's gender (based on knowledge, internet searching, etc.).

Other potential information to consider include:

- How many inventors (assess both male and female) are repeat inventors?
- What is the correlation between patent filing and product launch for patents including women versus patents not including women? Data has shown that patents including women are, overall, more commercially successful.
- What is the correlation between patents and associated product sales for patents including women inventors and for patents not including women inventors? Data has shown that patents including women are, overall, more commercially successful.

Self-Assess Your Organization for Gender Parity in Innovation

The following self-assessment can be useful in assessing your organization and turning that assessment into meaningful discussions of needs and next steps.

Gender Parity in Innovation Organizational Self-Assessment

1- Pre-Aware	• Our leaders and/or employees are largely unaware of gender disparity in innovation and have few or no active programs to create awareness and/or address this issue.
2 - Aware	• Our leaders are aware of gender disparity in innovation and we are bringing awareness to the larger organization as a whole, but we have few or no active programs to address gender disparity in innovation.
3 - Align	• Our leaders and employees are aware of gender disparity in innovation and promote an atmosphere of inclusion and awareness and have a few active programs to address gender disparity in innovation.
4 - Integrate	• Our leaders and employees are aware of gender disparity in innovation and have numerous active programs to address gender disparity in innovation.
5 - Sustain	• Our leaders and employees are aware of gender disparity in innovation and have numerous active programs to address gender disparity in innovation. Further, my organization actively tracks metrics around this issue and/or communicates our commitment to addressing this issue externally. Our organization is a change agent for gender parity.

For companies in the “pre-aware” and “aware” categories, their time is best spent initially focusing their efforts on increasing awareness before moving to the next steps.

For companies in the “align” category, their time is best spent assessing root causes and using those assessments to direct programs to these root causes.

For companies in the “integrate” and “sustain” categories, their time is best spent on developing metrics, identifying new or additional programs, celebrating successes, and confirming that no new root causes are arising in the organization (i.e., returning to Step 1).

What is the “Ask”?

Carefully consider your “ask.” Many organizations spend the first portion of their executive meeting creating awareness and walking through the 4 steps of the toolkit at a high level. The second half of the meeting is often spent getting support for a specific request(s). Most organizations ask executives for one of the following two options:

1. A request for (1) support for increasing awareness (and a plan to do so); and (2) support for investigating root causes (and a plan to do so).
2. A request to (1) identify and devote resources to assess the gender diversity statistics for the organization and (2) once this information is obtained, reporting out to the executives and recommending next steps.

Chapter 1. Section 2: Diverse and Female Employee Awareness & Support

Awareness and engagement of employees throughout the organization are both necessary for success. This section recommends ways to initially engage employees at all levels of the organization.

Increasing awareness of the gender disparity issue at various levels in the organization can be effective, even if these groups have overlapping membership. Increasing awareness takes more than a single presentation. Further, awareness presentations should not be limited solely to diverse groups, as success will require awareness and engagement by non-diverse advocates, mentors, and coaches. We have found that women and men alike are unaware of the disparity. Some exemplary groups to bring awareness to include:

Affinity Groups

- e.g. Women's Leadership, African Americans Network, Hispanic Networks, Latin Americans Networks, Pride Networks, Asian Americans Networks, etc.
- Consider also soliciting information on root causes for disparity with these groups, as is described in greater detail in [Chapter 2](#).

Leaders/Managers

- Update leaders and managers and brainstorm best practices for how to increase and support diversity in innovation in each organization. The presentations can be tailored to each individual group within the larger organization, increasing the chance of overall success.

Laboratory Groups and/or Technology/R&D Meetings

- e.g. Address the issue during routine management/lab team meetings (such as monthly or quarterly meetings).
- This can be a great time to identify non-diverse or female employees who are passionate about this issue and can be mentors, advocates, or coaches.

Small development groups of female or diverse employees:

- e.g. Lean In™ Circles
- [Collaboratory for Women Innovators at the University of Florida](#)

A sample presentation for use at such events to create initial awareness is attached here.

Chapter 1. Section 3: Ongoing Organization-Wide Awareness

As your organization continues the journey toward gender parity in innovation, it's crucial to routinely update the organization on the efforts and celebrate successes.

Providing routine updates at some frequency not only creates positive buzz around these efforts and behaviors but also keeps this topic in the forefront for leaders and employees throughout the organization.

Some quick-hit ways to continue and build organization-wide awareness include the following:

- Organization-Wide or Group-Wide Spotlights
 - These remind people that there are women and diverse inventors and help women and diverse employees self-identify with others.
 - Sample ideas: all organization or group emails, posts on internal websites, presentations, etc. that focus on the research, patents, milestones, personal stories, licensing wins, patent litigation wins, etc. of individuals.
 - Samples available [here](#) and [here](#) and [here](#) and [here](#).
- Social Events and/or Celebrations for Diverse or Female Inventors
 - These events provide networking opportunities and awareness of the work being done.
- Social Media Spotlights
 - Highlight women and diverse inventor achievements, such as patent or trademark filings or personal stories of achievement.

Chapter 1. Section 4: Curated List of Articles on the Topic of Gender Parity in Innovation

- [WIPO Economic Research Working Paper No. 33](#)
- [Institute for Women's Policy Research: Gender Patenting Gap](#)
- [Stanford University: Gender Analysis of Invention Disclosures](#)
- [Institute for Women's Policy Research: Equity in Innovation - Women Inventors and Patents](#)
- [PTO Progress & Potential Report](#)
- [McKinsey & Company: Why Diversity Matters](#)
- [Josh Bersin: Why Diversity and Inclusion Has Become a Business Priority](#)
- [Harvard Business Review: How Diversity Can Drive Innovation](#)
- [Science Magazine: How Scientists are Fighting Against Gender Bias in Conference Speaker Lineups](#)
- [IPWatchdog on USPTO Report: Only Four Percent of Patents Name Women-Only Inventors Over the Last Decade](#)
- [NYSBA Journal: Accelerating Talent](#)
- [MIT White Paper: Who Becomes an Inventor in America](#)
- [Association of University Technology Managers: Gender in the Global Research Landscape](#)
- [New York Times: Picture a Leader: Is She a Woman?](#)
- [Chemical & Engineering News: Coming Out in Chem Class](#)
- [AUTM: Women Inventor's Toolkit](#)
- [Yale University: Why Do Women Inventors Win Fewer Patents?](#)
- [USPTO Inventor Info Chat](#)
- [Across Industries, the Female Inventor Rate is Half the Female Employment Rate](#)
- [Diversity in the STEM workforce varies widely across jobs](#)

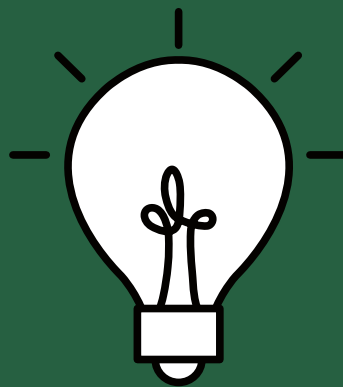
- [CLOSING DIVERSITY GAPS IN INNOVATION: GENDER, RACE, AND INCOME DISPARITIES IN PATENTING AND COMMERCIALIZATION OF INVENTIONS](#)
- [Bibliometrics: Global Gender Disparities in Science](#)
- [The Academic Advantage: Gender Disparities in Patenting](#)
- [Indicators for Social Good](#)
- [WIPO Share of Women Inventors Increasing, but Gaps Remain](#)
- [Gender Profiles in Worldwide Patenting](#)
- [Achieving LGBTQ representation in STEM](#)
- [USPTO's Progress and Potential A profile of women inventors on U.S. patents](#)
- [Progress and Potential: 2020 update on U.S. women inventor-patentees](#)
- [Santa Clara Law's Diversity in Innovation Best Practices Guide](#)

Chapter 1. Section 5: Curated List of Sources on the Topic of Overall Diversity in Innovation

- [Lisa Cook's Podcast – Patent Racism](#)
- [Temple Grandin Interview – Thinking Like the Herd](#)
- [Report of IP Inclusive diversity benchmarking survey November 2019](#)
- [IPReg Diversity Survey 2021](#)
- [Les Chiffres de la Profession](#)
- [Inclusion and Diversity Annual Report 2019-2020](#)

DID YOU KNOW?

The *disposable diaper* was invented by Marion Donovan using a shower curtain for her own children. Her invention was sold to Keto Corporation for \$1 million in 1949 and were then sold at Saks Fifth Avenue.



Chapter 2 (Step 2)

ROOT CAUSE ASSESSMENT

The goal of this step is to identify the key root causes in your organization that contribute to or result in gender disparity in innovation.

CHAPTER OUTLINE:

Section 1: 4 Key Steps to Root Cause Assessment

Section 2: Collecting and Interpreting the Data

1. Mix-and-Match Data Sources
 - a. Surveys
 - b. Small Group Feedback/Discussion
 - c. 1:1 Conversations
2. Ways to Obtain Data
 - a. The 5 Why Method
 - b. Fishbone or Ishikawa Method
 - c. The Pareto Method
3. Who to Ask



Chapter 2. Section 1: Root Cause Assessment

Often, after identifying that a problem exists, we immediately seek to resolve the problem. For example, if you break your arm, pain medicine will remove the pain (the symptom), but the root cause (the broken bone) must be addressed before you can properly heal. With complex problems, like lack of gender parity in patenting, the long-term results are far superior when adequate time is first spent identifying root causes for the disparity. Initially identifying the root causes allows an organization to tailor efforts to specifically address the root causes for the disparity, thus enabling faster correction and higher levels of success. By eliminating the root causes of the problem, organizations can take measures to eliminate or reduce the recurrence of the problem. The research required to identify the root causes is hard work. But it is essential for long-term success, especially in organizations that are focused on continued improvement.

At the highest level, root cause analysis involves 4 basic steps:

1. Define the problem
2. Collect data relating to the problem
3. Interpret the data to determine what is causing the problem
4. Prioritize the root causes

For purposes of this toolkit, we assume the premise is a lack of diversity in innovation/patenting, as shown from current studies and data. Some ideas for ways to collect data are as follows.

Chapter 2. Section 2: Collecting and Interpreting Data

The most reliable data is gathered by using a variety of collection methods. Specifically, it is preferable to collect data from each of the following (1) large groups; (2) small groups; and (3) individuals. Large groups provide high-level data and facilitate inclusion of many different viewpoints. Smaller groups provide access to more nuanced data and give access to examples that illuminate the larger points derived from the large groups.

Data Obtained from Large Groups:

Collection of data from large groups is typically best accomplished through a survey(s). Optimal surveys are short and high-level. They permit organizations to get a pulse on the issue/problem. Sample surveys are available [here](#) and [here](#).

These specific surveys were sent to all technical employees and legal staff in large organizations. In such organizations, it is imperative to keep the number of questions to a minimum because the longer the survey, the less likely that people will take the time to respond. Another best practice is to provide an opportunity for survey respondents to write in any specific comments and/or to provide small group or individual discussion(s) or feedback on the topic. Providing an opportunity for small group or individual feedback can be a great way to incentivize passionate people to get involved and further the discussion and collection of data in small groups or 1:1.

See [Patent Your Passion](#)

Small Group Discussion and 1:1 Discussion(s):

Small group and 1:1 discussion(s) typically provide the richest and most nuanced data, as well as the personal stories that bring the high-level data to life. There are 5 popular methods or tools to use when obtaining this data. Feel free to mix-and-match these:

A. 5 Why Method

At the most basic, 5 Why Method involves asking “why” 5 times (or more) in order to get to the true root cause. A useful graphic that shows how this practice can help get to the “true” root cause is below:

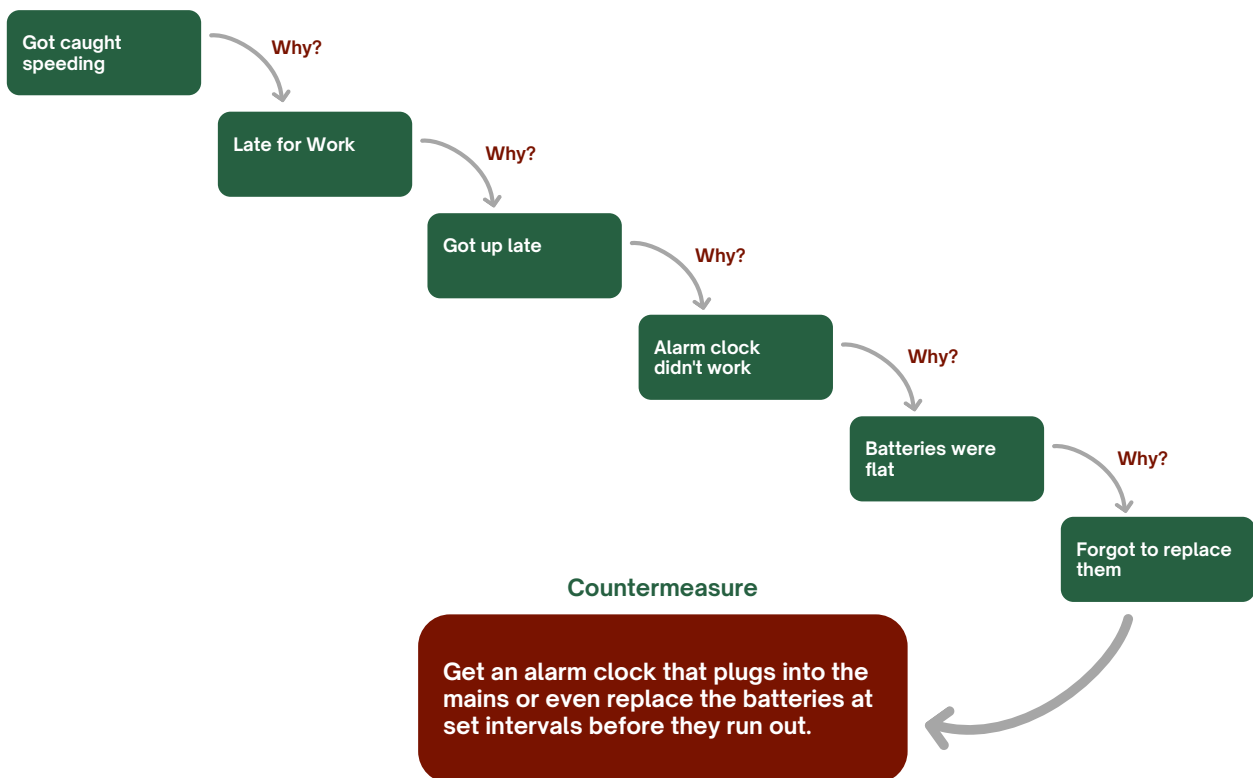


Image source - <http://www.educational-business-articles.com/5-whys/>

The 5 Why Method can be especially effective in brainstorming or 1:1 sessions. The 5 Why Method can be combined with traditional brainstorming (where small groups discuss all possible causes for the problem and possible solutions) or with brain-writing (which focuses on individuals writing their thoughts instead of vocalizing them). Brain-writing can be an excellent way to get the thoughts and opinions of less vocal participants. Once root causes are captured, they can be categorized.

B. Fishbone or Ishikawa Method

Invented by Dr. Ishikawa, the Ishikawa Method involves the following steps:

1. Define the problem
2. Brainstorm with the team on possible root causes of the problem
3. Use the relevant M's while doing so:
 - a. Man (People) – individuals performing the process or involved in it
 - b. Machine (Equipment) – tools used within the process
 - c. Method (Process) – procedures followed
 - d. Materials – inputs to the process
 - e. Measures– data on input
 - f. Mother Nature (Environment) – the environment
4. Prioritize all of the causes under the relevant M's

A sample graphical depiction of the output of this method is as follows:

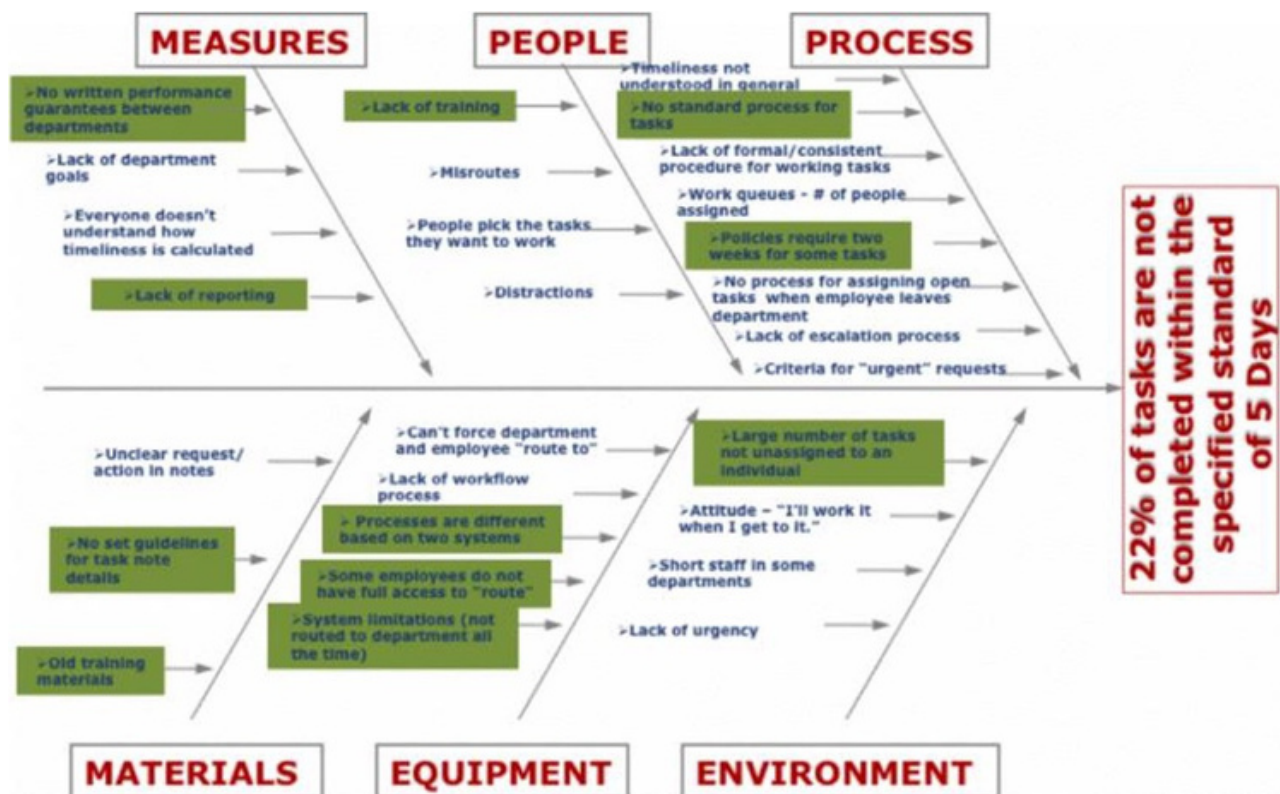


Image source - <https://goleansixsigma.com/achieving-a-19-improvement-in-response-time-using-a-cause-and-effect-diagram/>

Once the root cause brainstorm ideas are prioritized, the major root causes are highlighted. Brainstorming for solutions of the major causes is the next step.

With specific reference to the issues of gender disparity in innovation, many of the M's apply. For example, some of the programs to address root causes discussed in Chapter 3 (Step 3) fit well under the M's as follows:

Man / People

- Female technical employees typically have strong perfectionist tendencies and often do not submit their inventions for patenting because they are never "perfect"
- Female technical employees tend to underplay their contributions or the impact of them, which may lead to not submitting their inventions for patenting or not being appropriately listed as an inventor on an invention

Machine

- The invention submission process may be unknown or not well understood to everyone in the organization, especially diverse employees who have not submitted inventions for patenting

Method

- The decision-makers for patent filing authorization (i.e., patent review committee) may be all or mostly men, which can be intimidating to female and diverse inventors

Material

- Inventions are conveyed to an IP professional by word of mouth, and some IP professionals fail to effectively communicate with diverse employees, never realizing that there is a communication issue
 - There is a lack of information or consistency (no clear understanding or process)
 - on what is required for an invention to merit patent filing

Mother Nature / Environment

- The culture of the organization does not put women on key technical programs that lead to patents
- Women may be in job roles that do not naturally lead to inventions that are typically patented (for example, analytical roles)

Some organizations have found this method and process quite useful in their efforts to improve their gender parity in innovation.

C. Pareto Method

The Pareto Method, also called the 80/20 rule, is based on the principle that 80% of the problems or effects come from 20% of the causes. The Pareto Method aims to determine the 20% in order to resolve 80% of the problem. Using the Pareto Method is a good way to scientifically or mathematically assess all of the data gathered in the steps above to determine which key root causes to prioritize.

Standard Pareto Method steps are as follows:

- Define categories or classifications for the causes (e.g., standard questions that all respondents will answer)
- Collect data (e.g. respondent answers)
- Calculate the number of occurrences or observations for each of the categories
- Convert the numbers into percentage of total
- Consider preparing graphs or charts to display the data

D. Who to Ask

Who to ask or obtain data from will vary by organization, but the best organizations obtain information from as many stakeholders and impacted people/groups as possible. Some exemplary groups include:

- Upper level corporate management
- Laboratory management
- Technical employees, including laboratory employees and technicians
- Patent attorneys and agents that work with technical employees on innovation
- Manufacturing and/or process engineering and support staff (where applicable)
- Affinity Groups
- HR representatives who interact with or support technical employees

DID YOU KNOW?

The *home security system* was invented by Mary Van Brittan Brown, a nurse who spent many nights home alone in Queens, NY while her husband was away. She used a camera that could slide into and look through four peepholes in her front door.



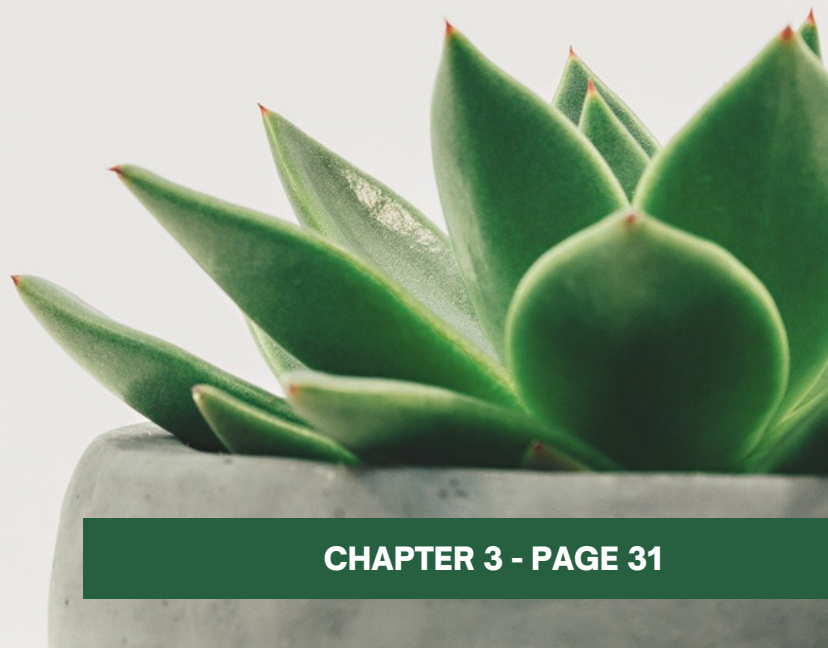
Chapter 3 (Step 3)

DEVELOP SHORT- AND LONG-TERM PROGRAMS

The goal in this phase is to choose or develop both short- and long-term programs that specifically address the key root causes that were identified during the root cause assessment phase. The chapter is organized by root causes. A tabular Root Cause Summary is included on the next page, and the root causes are hyperlinked to direct the user to a more fulsome discussion of that root cause and the suggested programs to address that specific root cause. (Please press Ctrl while clicking the underlined text to be directed to the hyperlink.)

As you are aligning programs with root causes, keep in mind that often more than one root cause may combine to create challenges. For example, a lack of awareness of the process to submit inventions for consideration for patenting is included in the toolkit both [Root Causes Stemming from Inventors](#), as well as [Root Causes Stemming from the Process](#). If the lack of awareness is because inventors do not bother to ask and no training or mentoring is provided, that is largely addressed in the [People-Related Root Causes](#) section of the toolkit. If the lack of awareness is because the process is hidden, too complex or biased, that is largely addressed in the Process-related Root Causes section of the toolkit.

Therefore, after identifying your key root causes, consider all of the possible areas in which those root causes may arise.



Root Cause Summary

People-Related Root Causes

Inventors or Potential Inventors

- Lack of awareness of the invention submission process
- Inventors are too busy
- Confidence Gap
- Perfectionist Tendencies
- Female and Diverse Employees do not self-identify as inventors

Managers of Inventors of named Inventors

- Female and Diverse Employees are Not on Programs with High Likelihood of Patent Filing

IP Professionals (attorneys and agents)

- Attorneys/Agents Intimidating or Too Busy

Process-Related Root Causes

- Invention Submission / Patenting Process is Biased, Intimidating, or Unclear
- Patenting Process Not Known

Culture/Environment-Related Root Causes

- My Organization Doesn't Support or Is Not Welcoming to Female or Diverse Inventors
- Pipeline / Leaky Pipeline

People-Related Root Causes

“People-related root causes” are causes for which the primary source of the root cause lies in the workforce. Thus, the suggested programs involve affecting the workforce/people in the organization. The term is not meant to suggest that the people are the problem, but instead to suggest that targeting programs to assist the employees will provide the highest impact of change.

For purposes of this toolkit, the “people” of an organization are broken down into 3 groups: (1) inventors or potential inventors; (2) managers of inventors or potential inventors; and (3) IP professionals (including attorneys and agents).

Because the root causes differ within each of these employee groups, the programs to target these groups also vary.

Inventor or Potential Inventor-Related Root Causes

Inventor or potential inventor root causes are those for which the primary source of the root cause lies in the inventor or potential inventor community. Because inventors on patent applications are not always technical employees, the term “inventors” includes “potential inventors,” including all employees, any of whom could be inventors on a patent application. This includes non-technical employees, first-time invention submitters, managers, legal professionals, technical service employees, application development employees, etc.

Root Cause: Lack of Awareness of the Invention Submission Process

With this root cause, inventors or potential inventors are simply not aware of or familiar with the process or steps required to submit an invention for consideration for patenting. In our busy lives, the task of figuring out a process can seem daunting enough to deter an inventor from submitting his or her idea. Therefore, it is essential in all organizations that the process is clear and known.

In this section, the focus is on making employees aware (1) that there is a process and (2) how to access the process as well as making clear that all employees are encouraged to submit their ideas. The Process root cause section addresses making sure that the invention submission process is straightforward, unbiased, and accessible to all.

Potential Programs:

1. Organization-Wide Process Awareness Communications

Posting or making available the invention submission process steps (and hyperlinks to any required documents) on an organization-wide system (e.g., an internal website) is a simple step that can generate big results quickly. When paired with training opportunities in small group settings (e.g., for an affinity group or laboratory/business), these communications are especially impactful.

2. Regular Communication to Inventor Populations Re: the Process

Regular reminders – especially by leaders, management and/or IP professionals – of the process and management’s support for the process can be quite impactful. Pairing these reminders with celebrations of people who have filed patent application or obtained issued patents (such as inventor banquets, plaques, recognition in group meetings, etc.) can be especially meaningful.

3. IP Professional Availability and /or Mentoring

Increase access to IP professionals and/or mentors who can educate and support the less experienced or less confident inventors and increase awareness of the process.

Root Cause: Inventors are Too Busy or Do not View Patenting as an Important Part of their Job

Some inventors report that patenting is not an important part of their job or that they are too busy to bother to patent their inventions. For companies that value this activity but hear this from employees, there is clearly a disconnect that needs to be mended. The following are some programs that may assist in correcting the disconnect.

Potential Programs:

1. Public Celebration/Recognition of Patenting Activities

Public (internal and/or external to the organization) celebrations of patent activity (patent filing, patent issuance, licensing, etc.) clearly convey the message - through action - that this is an activity that the company values and promotes and that will be rewarded in an employee's career. These celebrations do not need to be extravagant or expensive to be impactful. For example, celebrations could be external articles, notices, etc., or internal celebrations company-wide, within a lab, or even just 1:1 between an employee and their manager. Some exemplary recognition communications are provided [here](#) and [here](#).

2. Patent Activity Remuneration

Some organizations show the value of this activity by monetarily rewarding employees for activities like invention submission, patent filing, and/or patent issuance.

Root Cause: Inventors Experience a Confidence Gap that Deters Them From Submitting their Inventions for Consideration

In their 2012 book *The Confidence Code*, Claire Shipman and Katty Kay state that “there is a particular crisis for women—a vast confidence gap that separates the sexes” and “[w]omen feel confident only when they are perfect. Or practically perfect.”¹⁰ This confidence gap can result in women not submitting their ideas for consideration for patenting because they are “not good enough,” “not groundbreaking enough,” or “they are not yet fully fleshed out.” The confidence gap can also result in women who are part of an inventive team being left off the list of inventors in a patent filing. Because of this confidence gap, organizations may not be capturing the full contribution of a large segment of their technical workforce. As a result, the organization can lose the ability to patent-protect its important ideas and/or its patents could be deemed invalid for improper inventorship. These results can cost millions of dollars. This is one of the most common root causes and is likely present, to some extent, in all organizations.

Potential Programs:

1. Mentoring and Coaching

Pairing an employee who is experiencing the confidence gap with a strong and active mentor or coach shows the organization’s belief in and support of that employee, which can bolster the employee’s confidence. Further, strong mentoring can help the employee learn confidence and develop the comfort and communication skills to convey that confidence through speech and action.

Mentoring and coaching can also help diverse and female employees gain greater comfort with self-promotion. Mentors and coaches of course do not need to be of the same gender, color, or ethnicity as the employee being mentored/coached. In many organizations, successful and experienced female inventors mentor less experienced women inventors. Experienced male inventors and/or female inventors from outside the organization also make excellent mentors.

[10] Kay, Katty and Shipman, Claire. “The Confidence Gap.” *The Atlantic* May 2014, <https://www.theatlantic.com/magazine/archive/2014/05/the-confidence-gap/359815/>. Accessed 12 Aug. 2019.

2. Affinity Groups for Diverse Technical Employees (Inventors)

Creation of an organization-wide affinity group for diverse and female technical employees/inventors provides these inventors with access to a broad-based, welcoming, and relaxed network of colleagues that can provide support and mentoring.

3. Management Training

This training can teach managers how to identify employees experiencing a confidence gap. Effective managers provide support and guidance as well as make their employees aware of the programs or support available to assist them. When paired with inclusion training, this can be especially impactful.

4. Employee Diversity and Inclusion Training

Diversity refers to the traits and characteristics that make each person unique while inclusion is a collaborative, supportive, and respectful environment that increases the participation and contribution of all employees.

Inclusion is a team sport, so training the entire organization on inclusive behavior ensures that non-managers working on inventive teams can identify employees experiencing a confidence gap, alert the manager, and/or personally support the employee and/or make that employee aware of the programs or support available to assist that employee. It has been shown that there is a strong correlation between diversity in the leadership of large companies and financial outperformance, based on a larger data set of 1000 companies in 12 countries.¹¹ Companies in the top quartile for gender diversity on their executive teams were 21% more likely to have above-average profitability than companies in the 4th quartile.¹²

There are various forms of employee inclusion training and programs that can improve diversity attitudes and behavioral intentions to provide an inclusive, respectful and productive workforce and workplace.

Some examples of inclusion training and programs include:

- Team-building exercises.
- Awareness training such as unconscious bias or discussing the perspective of a minority group and the distinct challenges a minority might face.

[11] Hunt, Vivian et al., "Delivering through Diversity." McKinsey & Company January 2018, https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Organization/Our%20Insights/Delivering%20through%20diversity/Delivering-through-diversity_full-report.ashx. Accessed 10 Sep. 2019.

[12] Refer to 13.

- Skills training to help people build skills such as communicating better with people from diverse backgrounds and reducing the level of unconscious bias in their decision-making.¹³
- Creating a company focus and strategy on inclusion.
- Creating a college recruitment program targeting diversity.
- Ensuring well-rounded leadership development programs.
- Reviewing company trainings to ensure they portray an inclusive environment.

5. Regular Communication to Inventor Populations Re: the Process

Regular reminders – especially by laboratory and Research & Development management and leaders and/or IP professionals – of the process and management’s support for the process can be quite impactful. To address this confidence gap root cause, such communications (1) should provide sufficient detail for an inventor to better understand the negative ramifications of not submitting an idea (make clear that it is not an issue of the employee being attention-hogging but instead an issue of lost money for the organization and thus poor performance by the employee), (2) describe what ideas are appropriate for submission, and (3) reinforce that the employee will receive support through the invention submission process. Pairing these reminders with celebrations of people who have filed patent application or obtained issued patents can be especially meaningful because then hesitant or first-time inventors see others who have successfully walked this path and can contact those individuals for advice or mentoring.

6. Public Celebration/Recognition of Patenting Activities

Public (internal and/or external to the organization) celebrations of patent activity (patent filing, patent issuance, licensing, etc.) clearly convey the message - through action – that this is an activity that the company values and promotes and that will be rewarded in an employee’s career. These need not be huge to be impactful. For example, these could be external articles, notices, etc. or internal celebrations company-wide, within a lab, or even just 1:1 between an employee and their manager. Some exemplary recognition communications are provided here and here.

7. Group Mentoring Innovation Employees

For example, organize or host Lean InTM circles or a similar group construct. Tools for Lean InTM circles are publicly available. Also publicly available are the tools discussed in Russ Harris’ book, *The Confidence Gap: A Guide to Overcoming Fear and Self-Doubt* (2011).

[13] Lindsey, Alex et al., “Two Types of Diversity Training That Really Work.” Harvard Business Review July 2017, <https://hbr.org/2017/07/two-types-of-diversity-training-that-really-work>. Accessed 10 Sep. 2019.

Root Cause: Inventors or Potential Inventors Have Perfectionist Tendencies that Deters Them From Submitting their Inventions for Consideration

In their 2012 book *The Confidence Code*, Claire Shipman and Katty Kay found that “[w]omen are more likely than men to be perfectionists, holding themselves back from answering a question, applying for a new job, asking for a raise, until they’re *absolutely 100 percent sure* we can predict the outcome. (Women applied for a promotion only when they met 100 percent of the qualifications. Men applied when they met 50 percent.)”¹⁴ These perfectionist tendencies can result in women not submitting their ideas for consideration for patenting because “more data is needed” or the idea is “not good enough.” Because of this drive for perfectionism, organizations may not be capturing the full contribution of a large segment of their technical workforce.

Potential Programs:

1. Mentoring and Coaching

Pairing an employee who tends toward perfectionist tendencies with a strong and active mentor can help the employee learn and gain comfort with the concept of “good enough” to submit for consideration. Having a trusted mentor to support an employee increases their confidence and comfort. In many organizations, successful and experienced female inventors mentor less experienced women inventors. Experienced male inventors and/or female inventors from outside the organization also make excellent mentors.

2. Affinity Groups for Diverse Technical Employees (Inventors)

Creation of an organization-wide affinity group for diverse and female technical employees/inventors provides these inventors with access to a broad-based, welcoming, and relaxed network of colleagues that can provide support and mentoring.

3. Management Training

This training can teach managers how to identify employees whose perfectionist tendencies may be blocking them from submitting their inventions for consideration. Effective managers provide support and guidance, as well as make their employees aware of the programs or support available to assist them. When paired with inclusion training, this can be especially impactful.

[14] Bennett, Jessica. “It’s Not You, It’s Science: How Perfectionism Holds Women Back.” *Time Magazine* 22 Apr. 2014. <https://time.com/70558/its-not-you-its-science-how-perfectionism-holds-women-back/>. Last accessed 12 Aug. 2019.

4. Employee Diversity and Inclusion Training

Diversity refers to the traits and characteristics that make each person unique while inclusion is a collaborative, supportive, and respectful environment that increases the participation and contribution of all employees.

Inclusion is a team sport, so training the entire organization on inclusive behavior ensures that non-managers working on inventive teams can identify employees experiencing a confidence gap, alert the manager, and/or personally support the employee and/or make that employee aware of the programs or support available to assist that employee. It has been shown that there is a strong correlation between diversity in the leadership of large companies and financial outperformance, based on a larger data set of 1000 companies in 12 countries.¹⁵ Companies in the top quartile for gender diversity on their executive teams were 21% more likely to have above-average profitability than companies in the 4th quartile.¹⁶

There are various forms of employee inclusion training and programs that can improve diversity attitudes and behavioral intentions to provide an inclusive, respectful and productive workforce and workplace.

Some examples of inclusion training and programs include:

- a. Team-building exercises.
- b. Awareness training such as unconscious bias or discussing the perspective of a minority group and the distinct challenges a minority might face.
- c. Skills training to help people build skills such as communicating better with people from diverse backgrounds and reducing the level of unconscious bias in their decision-making.¹⁷
- d. Creating a company focus and strategy on inclusion.
- e. Creating a college recruitment program targeting diversity.
- f. Ensuring well-rounded leadership development programs.
- g. Reviewing company trainings to ensure they portray an inclusive environment.

5. Regular Communication to Inventor Populations Re: the Process

Regular reminders – especially by laboratory management and/or IP professionals – of the process and management's support for the process can be quite impactful. To address the perfectionism root cause, such communications should provide sufficient detail for an inventor to better understand when an idea is appropriate for consideration. Pairing these reminders

[15] Hunt, Vivian et al., "Delivering through Diversity." McKinsey & Company January 2018, https://www.mckinsey.com/~media/McKinsey/Business%20Functions/Organization/Our%20Insights/Delivering%20through%20diversity/Delivering-through-diversity_full-report.ashx. Accessed 10 Sep. 2019.

[16] Refer to 13.

[17] Lindsey, Alex et al., "Two Types of Diversity Training That Really Work." Harvard Business Review July 2017, <https://hbr.org/2017/07/two-types-of-diversity-training-that-really-work>. Accessed 10 Sep. 2019.

with celebrations of people who have filed patent application or obtained issued patents can be especially meaningful because then hesitant or first-time inventors see others who have successfully walked this path and can contact those individuals for advice or mentoring.

Root Cause: Female and Diverse Employees Do Not Self-Identify as Inventors

Increasingly, research shows that there is a strong tendency for women or diverse employees to have difficulty self-identifying as an inventor. For example, the most recognized scientists are male (e.g., Einstein, Steve Jobs, etc.) and often the version of a scientist promoted to kids is male (e.g., “Bill Nye the Science Guy”). Outstanding female scientists are not as much a part of mainstream media. On the theory that you can’t be it if you can’t see it, females and those of under-represented populations interpret this messaging as suggesting that science or being a scientist is not a field or career option open to them. This can propagate through one’s career, in that female and diverse employees – even those with technical degrees and verified scientists – do not self-identify as inventors.

Potential Programs:

1. Public Celebration/Recognition of Patenting Activities

Public (internal and/or external to the organization) celebrations of patent activity (patent filing, patent issuance, licensing, etc.) clearly convey the message – through action – that female and diverse employees are inventors. These need not be huge to be impactful. For example, these could be external articles, notices, etc. or internal celebrations company-wide or within a lab. When trying to truly change this perception, volume can be the best weapon – frequent short communications highlighting women and diverse employees as inventors create a new rhetoric that leads to a new implicit message – women and diverse employees across the organization are amazing inventors. Some exemplary recognition communications are provided [here](#) and [here](#). Consider using African American, Asian American, Hispanic/Latino History, Pride, or Women’s History month as a means of touting specific groups advancing innovation.

2. Affinity Groups for Diverse Technical Employees (Inventors)

Creation of an organization-wide affinity group for diverse and female technical employees/inventors provides these inventors with access to a broad-based, welcoming, and relaxed network of colleagues that can provide support and mentoring as well as frequent reminders that women are amazing inventors.

3. Mentoring and Coaching.

Pairing an employee that does not self-identify as being an inventor with a strong and active mentor who is an inventor can help the employee gain comfort with this self-identification. Having a trusted mentor to support an employee increases their confidence and comfort. In many organizations, successful and experienced female inventors mentor less experienced women inventors. Experienced male inventors and/or female inventors from outside the organization also make excellent mentors.

4. IP Professional Engagement

Attorneys and agents write and file the patent applications protecting an organization's valuable inventions. Ensuring that these IP professionals are engaged with the inventive team such that they can identify for themselves who should be rightly deemed an inventor ensures stronger patent protection for the organization and also affords an opportunity for the IP professional to show a female or diverse employee that they are an inventor. Further, truly inclusive IP professionals are skilled at including claims (often dependent claims) in the patent application that permit all members of the team to be included in the patent (while simultaneously strengthening and broadening the patent coverage).

Manager – Related Root Causes

Manager-related root causes are those for which the primary source of the root cause lies with the managers and/or management team.

Root Cause: Female and Diverse Employees are Not on Programs with High Likelihood of Patent Filing

Certain types of development programs in an organization lead to patent filings while other programs do not. For example, changing the color or raw materials of an existing product can be challenging and important technical work, but often will not result in patent application filings. In contrast, creating a new-to-the-world product or chemical is more likely to lead to patent filings. Many organizations report that women and diverse employees are not put on patent-heavy programs at the same rate as their non-female or non-diverse counterparts.

The causes for this disparity are many and varied. Examples range from confidence gap issues keeping female or diverse employee from volunteering for these projects to manager bias against women with young children keeping managers from assigning female employees to these high-profile projects. This version of the toolkit recommends general actions for female and diverse employees not being on programs with high likelihood of patent filing. A best practice is to understand some of the organization-specific sub-causes for this disparity and tailor the programs to address those root causes specifically, and we encourage organizations to dig deeper as they improve their programs.

Potential Programs:

1. Manager Training

Managers lead organizations so training the managers increases the number of change agents and/or people who can communicate about the issue of disparity in innovation. But managers also need to be able to identify the areas where they can improve. Ensuring that female and diverse employees are placed on programs that lead to invention is something managers can control. Managers can be trained on how to take an honest look at their team and how they have staffed the programs for the laboratory and/or research & development facility.

This can create a greater self-awareness of inherent bias and tendencies. Awareness is followed by action to move people onto programs where patents are more likely, where possible, or to put them onto new programs as the programs are getting started.

2. Brainstorming Sessions

For an array of reasons, it is not always possible to move employees onto teams working on programs that are likely to file patent applications. In such instances, managers can sponsor such employees for group brainstorming / inventing sessions. Many companies have company-wide brainstorming/inventing sessions focused on how to solve a specific issue for the company or how to take advantage of a global trend. These brainstorming sessions are typically of limited duration (e.g., 1 day to 2 weeks) and give the employee the opportunity to engage in innovation activities that are likely to result in patent application filings without changing the employee's existing assignment.

3. Address Pipeline and Leaky Pipeline Issues

Managers are typically in charge of hiring for their organization and are often in the best position to ensure a strong pipeline of excellent STEM employees that are female and/or diverse. Further, studies show that one of the top reasons people do not like their job is their manager. Managers can help set the tone for the organization, including ensuring that the tone is inclusive, where female and diverse employees are valued and recognized and on programs that will further their development and career. Setting this tone will reduce the leak in the pipeline.

[See example of STEM Pipeline Program](#)

4. Managers Should Have Their Own Mentors/Coaches/Network

Make sure that managers have access to mentors, coaches, and colleagues so that they can share suggestions and ideas for creating a supportive environment for their employees. Managers can help set the tone for the organization, including ensuring that the tone is inclusive, where female and diverse employees are valued and recognized and on programs that will further their development and career. Some companies have had manager-only brainstorm sessions on how to move female and diverse employees onto programs where there is a lot of inventive activity and a high likelihood of patent application filings.

IP Professional-Related Root Causes

IP professional-related root causes are those for which the primary source of the root cause lies with the IP professionals, including attorneys, agents, liaisons, outside counsel, etc.

Root Cause: Attorneys/Agents Intimidating or Too Busy

Many first-time or newer inventors struggle with a confidence gap. When such inventors work up their confidence to approach their IP professional and that person is intimidating, dismissive, or too busy to assist, the inventor is not motivated to push back or return. The experience that inventors have with their IP professionals can determine their likelihood of repeating the process.

Potential Programs:

1. Thank Inventors for their Work

A simple thank you goes a long way. One inventor credits her 60+ patents to early experiences in her career with a patent attorney who made her feel valued and heard and routinely thanked her for her work.

2. IP Professional Availability

Increase access to IP professionals who can educate and support the less experienced or less confident inventors and increase awareness of the process. Specific examples include: office hours at the lab or research facility, “ask an IP attorney” email site with fast turn-around for questions, co-locate IP professional at lab or research location on a regular basis, and attend affinity sessions. Consider attending group meetings (i.e., get out of your office and meet people). Alternatively, create a series of classroom style trainings given by IP staff (preferably including women or diverse employees) about patenting.

3. Inclusion Training

Include the IP professionals in inclusion training so that they understand the unique role that they play in supporting female and diverse inventors in building confidence and expanding their presence in patent filings.

4. Sharing of Best Practices

The best IP attorneys and agents work with the full team and understand the contributions from all members of the team. Inventorship is a legal determination that the patent attorneys or agents make. As such, patent attorneys and agents are uniquely able to add claims (including dependent claims) to ensure that all members of the team are listed as inventors and to get broader, stronger patent coverage. Training other attorneys and agents how to do this and making it an expected practice will change inventor behavior and acceptance. Additionally, patent attorneys and agents who work closely with the inventive team will recognize who is involved and can dig deeper to make sure all participants, not just the most active or loudest, are considered when determining inventorship.

5. Pairing Female / Diverse Potential Inventors with Female / Diverse IP Professionals

Female and diverse employees or potential inventors may feel more comfortable working with an IP attorney or agent who is also either female or diverse. One reason for increased comfort is that having something in common with another person establishes a common ground and therefore certain base level of comfort. When the employee is more comfortable speaking with the IP professional, the employee may be more forthcoming with potential ideas for new invention disclosures, or may be more likely to speak up about their contributions.

6. Outside IP Counsel

Outside IP counsel can assist as well. A guide for outside counsel who want to assist advance their clients on this issue can be found [here](#).

Process-Related Root Causes

Process-related root causes are those for which the primary source of the root cause lies in the invention submission / patenting process. Thus, the suggested programs involve affecting the invention submission / patenting process. Since people implement processes, some of these root causes closely align to some of the People-Related Root Causes.

Root Cause: Invention Submission / Patenting Process is Biased, Intimidating, or Unclear

Many diverse or female employees report that the patenting process itself is either too intimidating (e.g., present your idea to the attorney or to a technical director and convince them to support a patent application filing), biased (e.g., no one on the review committee is female or diverse or most of the review committee is non-diverse), lacks feedback or provides vague feedback (e.g., if an invention disclosure is denied, how is the information sent back to the inventor), or unclear (e.g., it seems like each attorney wants something different for an invention submission, so an employee is never sure if the invention is ready and it is the right time for submission).

Potential Programs:

1. Audit & Change the Organization's Invention Submission / Patenting Process

Focus the audit on sources of implicit bias and user-friendliness. Follow the root cause guidance in Chapter 2 by getting feedback from organization-wide participants (e.g. surveys), in small groups, and 1:1 with employees. Consider things like “Are decision makers diverse?” and “Can all inventors make submissions?” This audit will identify sources of bias and barriers to submission. Based on the data, revise the invention submission/patenting process to eliminate sources of bias or reduce their impact. Widely publish the revised process – especially to diverse and female groups and affinity groups in the organization. Ensure that the technical managers also spread the word within their groups on the revised process.

Some examples of revisions organizations have made are as follows:

- Create objective criteria (a list) to evaluate invention ideas for patenting. Communicate the list and stress its consistent usage to make patenting decisions more objective. Be a gatekeeper who stresses that decisions not to patent are supported by objective justifications.
- Change decision making committee membership periodically to include women and diverse employees.
- Where possible, include inventors in the decision-making process so they can defend inventions and learn how the decision is made. Invite them to have an ally, advocate, or the full team join them so that quieter and more introverted employees are comfortable in this setting.

2. Inclusion Training

Include the IP professionals in inclusion training so that they understand the unique role that they play in supporting female and diverse inventors in building confidence and expanding their presence in patent filings, as well as to help them understand the diverse needs of the employee population, which require them to be approachable and patient. This is especially impactful when paired with increasing inventor availability to IP professionals so that the inventors can form a relationship with and feel comfortable approaching IP professionals.

3. Sharing of Best Practices

The best IP attorneys and agents work with the full team and understand the contributions from all members of the team. Inventorship is a legal determination that the patent attorneys or agents make. As such, patent attorneys and agents are uniquely able to add claims (including dependent claims) to ensure that all members of the team are listed as inventors and to get broader, stronger patent coverage. Training other attorneys and agents how to do this and making it an expected practice will change inventor behavior and acceptance. Additionally, patent attorneys and agents who work closely with the inventive team will recognize who is involved and can dig deeper to make sure all participants, not just the most active or loudest, are considered when determining inventorship.

Root Cause: Patenting Process Not Known

With this root cause, inventors or potential inventors are simply not aware of the process or steps to submit an invention for consideration for patenting because the process is not written down, may not be clear, or the inventor has not yet been made aware of or trained on the software necessary for submission. In our busy lives, the task of figuring out a process can seem daunting enough to deter an inventor from submitting their idea. Therefore, it is essential in all organizations that the process is clear and available for everyone in the company in a common sense, known place, and help is available if needed.

Potential Programs:

1. Ensure that the Process is Clearly Written and is Easily Accessible to All Employees

Posting or making available the invention submission process steps (and hyperlinks to any required documents) on an organization-wide system (e.g., an internal website) is a simple step that can generate big results quickly. When paired with training opportunities in small group settings (e.g., for an affinity group or laboratory/business), these communications are especially impactful.

2. Regular Communication to Inventor Populations Re: the Process

Regular reminders – especially by laboratory and/or research facility management and/or IP professionals – of the process and where to go to see the steps/get the documents.

3. IP Professional Availability and /or Mentoring

Increase access to IP professionals and/or mentors who can educate and support the less experienced or less confident inventor and increase awareness of the process.

4. New Employees Are Made Aware of the Process Early and Often

New employees are inundated with new information when they begin a new job. It is important to make them aware of the process and where to find it and to repeatedly remind them of this information. Managers and leaders should periodically check in with new employees to make sure they are aware of the process for invention submission.

Culture/Environment-Related Root Causes

Culture/environment-related root causes are those for which the primary source of the root cause lies in the organization's culture and/or environment. These root causes are common and present in many organizations. For example, pipeline and leaky pipeline issues are included in this section. These are omnipresent in most organizations. However, pipeline and leaky pipeline issues are rarely the sole root cause. As such, it may be a mistake to conclude that increasing the pipeline will resolve all gender parity issues, and it takes time to fill the pipeline. As one corporate executive told us, "We are committed to working on increasing the pipeline. But if we do not simultaneously make the culture and environment into which the new hires will enter inclusive and welcoming, we will lose those new hires quickly or, perhaps even worse, never get the full value of their potential contributions." Because organizational cultures and environments vary so widely, the suggested programs below are high-level. Use these ideas as guidance to be modified to address the specific culture / environment of your organization.

Root Cause: My Organization Doesn't Support or Is Not Welcoming to Female or Diverse Inventors

Some inventors do not feel safe or comfortable sharing their inventive contributions and/or proposing new ideas for fear of not being supported. Other female or diverse inventors report feeling that their co-workers take credit for their ideas, and the female or diverse inventor does not feel comfortable or supported in speaking up and correcting this situation.

Potential Programs:

1. Public Celebration/Recognition of Patenting Activities

Public (internal and/or external to the organization) celebrations of patent activity by diverse or female inventors (patent filing, patent issuance, licensing, etc.) clearly convey the message - through action - that this is an activity that the company values and promotes and that will be rewarded in an employee's career. These need not be huge to be impactful. For example, these could be external articles, notices, etc. or internal celebrations company-wide or within a lab or even just 1:1 between an employee and their manager. Some exemplary recognition communications are provided [here](#) and [here](#). These celebrations and recognitions also remind the organization of the many female and diverse inventors and help women and diverse employees self-identify as inventors.

2. Mentoring and Coaching.

Active mentoring and coaching programs for female and diverse employees shows the organization's belief in and support of that employee and of employees who are female or diverse, which can bolster their confidence. In many organizations, successful and experienced female inventors mentor less experienced women inventors. Experienced male inventors and/or female inventors from outside the organization also make excellent mentors. Where the mentor and mentee have commonalities, this pairing can help women and diverse employees self-identify as inventors.

3. Affinity Groups for Diverse Technical Employees (Inventors).

Creation of an organization-wide affinity group for diverse and female technical employees/inventors provides these inventors with access to a broad-based, welcoming, and relaxed network of colleagues that can provide support and mentoring and that visibly shows the organization's support for female and diverse employees.

4. Management Training

This training can teach managers how to make clear to all employees, including those who are diverse or female, the important role they play and the value of their contributions. Effective managers provide support and guidance, as well as making their employees aware of the programs or support available to assist them. When paired with inclusion training, this can be especially impactful.

5. Employee Inclusion Training

Inclusion is a team sport, so training the entire organization on inclusive behavior ensures that non-managers working on inventive teams convey the value and import that all members of the team, including female and diverse members, bring to the team.

Root Cause: Pipeline / Leaky Pipeline

If your organization concludes that its only issue is pipeline, then you may want to consider revisiting the root cause assessment section. Pipeline and leaky pipeline issues are rarely the sole root cause, so it may be a mistake to conclude that increasing the pipeline alone will resolve all gender parity issues. As one corporate executive told us, “We are committed to working on increasing the pipeline. But if we do not simultaneously make the culture and environment into which the new hires will enter inclusive and welcoming, we will lose those new hires quickly or, perhaps even worse, never get the full value of their potential contributions.”

With specific reference to pipeline issues, most organizations have pipeline issues and have active programs to increase their hiring of female and diverse STEM employees. Find ways to link into those programs and advertise to potential new employees the programs that are in place or being launched to make this an excellent workplace once the prospective employee joins. This can be an excellent new hire sales pitch.

With specific reference to the “leaky pipeline” issue, this refers to the fact that once organizations hire qualified female and diverse STEM employees, these employees leave the technical organization at a faster rate than their non-female or diverse colleagues. Leaky pipelines are also omnipresent, but a leaky pipeline itself is never the sole root cause of gender disparity in innovation. Instead, devote time to understanding the root causes for the leaky pipeline and create programs to address those. These will improve the retention of these key employees and thus their satisfaction and contributions to innovation.

DID YOU KNOW?

Kevlar was invented by Stephanie Kwolek in 1964 during her career at DuPont which spanned over 40 years. Her discovery of a family of synthetic fibers five times stronger than steel paved the way for body armor, frying pans, racing sails and more.



Chapter 4 (Step 4)

LAUNCH AND MONITOR THE PROGRAMS



The goal in this step is to effectively launch the programs identified above, monitor and support them, and determine metrics that allow the organization to see progress (or lack thereof). Constant diligence and improvement will allow your organization to flourish.

Launch:

Best practices when launching programs include the following:

- Select a few meaningful and highly impactful programs and launch them really well instead of launching many small programs.
- Ensure that all stakeholders are aware of and support the programs to be launched.
- Have the program details determined and well-articulated, including audience, scope, timing, communication plan, and definition of success.
- Before launching, have a clearly defined and agreed upon definition of success, and determine metrics to measure that success.
- Clear and visible buy-in and support from management.

Exemplary metrics:

- Number or percentage of female or diverse inventors on patent applications, issued patents, or invention submissions and trajectory over a defined time period.
- Number or percentage of female or diverse first-time invention submitters or patent inventors and trajectory over a defined time period.
- Number or percentage of female or diverse repeat invention submitters or patent inventors and trajectory over a defined time period.
- Number or percentage of female or diverse new technical employees submitting inventions for patenting and trajectory over a defined time period.
- Number of affinity groups to whom presentations to increase awareness have been made.
- Number of invention submissions received from each affinity group.
- Number or percentage of women or diverse employees on key inventive programs and trajectory over a defined time period.
- Reduction in pipeline leak of diverse employees and diverse leaders.

Monitor:

Best practices to monitor the launched programs include the following:

- Review the activities / programs / processes on a regular basis and assess whether improvement is possible / needed.
- If possible, make improvements on the fly.
- Share the result(s) within the organization.
- Solicit feedback from the organization about the program and ways to improve upon it.
- On some set basis or timing, reengage in brainstorming and feedback solicitation to ensure that new root causes for gender disparity are not arising.
- Bad habits are like weeds – they grow where there is space. Make sure they are being ferreted out early. Receiving communication from others lets people know this is an ongoing issue and not a once and done issue.
- Best practice or example sharing with other companies or organizations and receiving their ideas for consideration within your organization.
- Communication externally provides more ideas and also helps create an external positive view of your organization for others.
- Learn from others and teach others through mentoring on this topic.



APPENDIX

Sample 1:1 or Small Group Pitch Materials

The following is a sample “script” to give you an idea of what has worked for others when talking with the key stakeholders/decision makers 1:1 or in small groups. You will need to go into more detail than the elevator pitch but still keep the conversation at a high level. Your “ask” is really to partner with them to address gender disparity in innovation in the organization/company. Make this script your own – these are just ideas.

Women are significantly underrepresented in the innovation process. Recent studies show that “although women have more than quintupled their representation among patent holders since 1977, only 18.8 percent of all patents had at least one women inventor in 2010.” “At the current rate of progress in recent years (2000-2010), women are not expected to reach parity in patenting until 2091.” Research also shows that increasing diversity in patenting results in higher return on investment and stronger patent protection. As such, it is becoming an imperative to bring awareness of and attention to the gender disparity gap in innovation.

I’m involved with IPO, a global organization including various multinational companies and universities, to look at the issue of gender disparity in innovation.


We have teamed with the World IP Organization (WIPO) to have access to statistics for each company. Our general goals are to (1) Bring Awareness to the Gender Disparity in Innovation and the Business Case for Expediting Gender Parity in Innovation; (2) Discuss Factors that Contribute to the Gender Disparity and (3) Create and Share Various Corporate and University Efforts to Address and Remedy the Gender Disparity.

To aid in all of these, the organization has put a toolkit for companies to use to get ideas for different ways to address these issues within their corporations/universities/organizations. This toolkit will give us some ideas for how to assess where our company is on this issue, how to identify the key drivers for our current behavior, and ideas for how other companies have moved the needle on increasing their gender parity in innovation.

I’d like to partner with you to look into this issue for our company/organization and to improve our innovative gender disparity. Doing so is in line with our company/organization’s diversity and inclusion goals / sustainability goals / HR goals. Further, I want to make sure that the excellent work being done by our female scientists is patented at the same rate as their male colleagues and to make sure that our company/organization is getting the full value of their contributions.

Sample Presentation

Diversity in Innovation



SAMPLE PRESENTATION

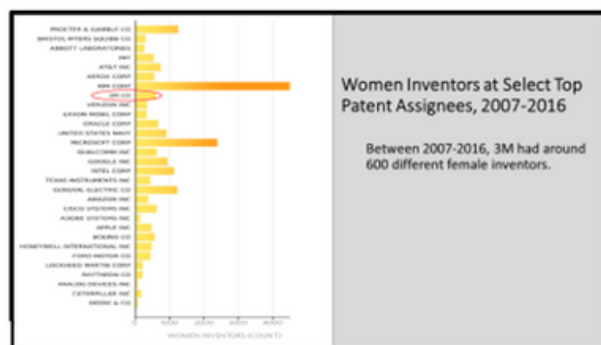
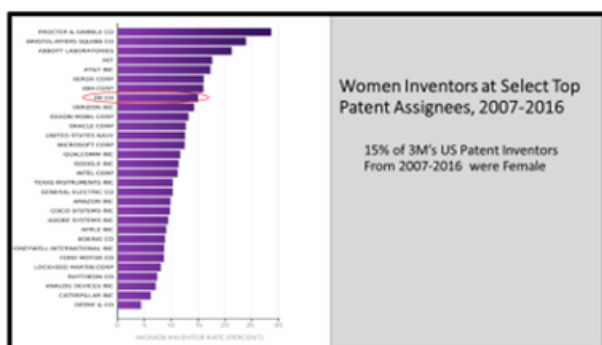
Diversity in Innovation

Introduction

- Awareness and engagement of ALL employees throughout the organization are both necessary for success.
- Women and diverse employees have technical skill and knowledge, yet their contributions are not patented at the same rate as those of their male counterparts.

Over 53% of PhDs are awarded to women.
Yet, only 12% of recognized innovators in the United States are women.

Source: National Science Foundation Statistics



Call to Action

These statistics suggest that we may not be capturing the full contribution of a large segment of our technical workforce – resulting in significant lost opportunity costs (e.g., unpatented inventions, delayed disclosures, etc.).

What to Do

Gender Parity in Innovation Process

Step 1 - Increase Awareness & Support

Step 2 - Discover Root Causes

Step 3 - Develop Short- and Long-Term Programs

Step 4 - Launch & Monitor the Programs

Raising awareness and internal support is an essential first step in making significant change within an organization. Increasing awareness is important in all organizations, but is especially important for those having leaders and/or employees that are largely unaware of gender disparity in innovation and are devoting little effort to addressing the issue. Awareness and support should be an ongoing, regular activity.

Organizations that are most effective at implementing change are those that spend time up front assessing the key root causes for their current state. As such, organizations that devote time to understanding the causes for their gender disparity will be able to address those specific root causes with targeted programs and thereby be more effective at implementing systemic, long-term change.

Once root causes are identified, organizations should develop a mix of short-term and long-term programs that address the specific root causes identified in step 2. This section is organized by root cause identified and within each root cause chapter suggests short-term and long-term programs that other organizations have found effective at addressing the specific root cause.

This portion of the toolkit focuses on ideas for successful program launch as well as suggested metrics and/or monitoring activities that will enable an organization to measure the success or progress of the gender diversity programs efforts. This section also provides tips for when and how to go back to steps 1 and 2 routinely to raise awareness and support and to see if new root causes (or unexplored root causes) develop.

Ongoing

Increase Awareness and Support

Presentations unique to affinity groups, small or large groups, leaders and managers, department groups - laboratory and technology groups, or technical groups – business and R&D groups.

Best practices information for TDs and lab managers.

Determine inventorship numbers globally, by business unit or technology area.

Discover Root Causes for Gender Disparity

Survey the T-WLF and/or technical community & follow up with a small group and 1:1 sessions.

External Benchmarking

Root Cause Summary

People-Related Root Causes

- Lack of awareness of the invention submission process
- Inventors are too busy
- Confidence Gap
- Not Identifiable Technologies
- Female and Diverse Employees do not self-identify as inventors

Process-Related Root Causes

- Many of Inventors at named inventors
- Female and Diverse Employees are Not on Programs with High Likelihood of Patent Filing
- IP Professionals' Inattention and/or Ignorance
- Attorneys/Agents Interfering w/ The Busy

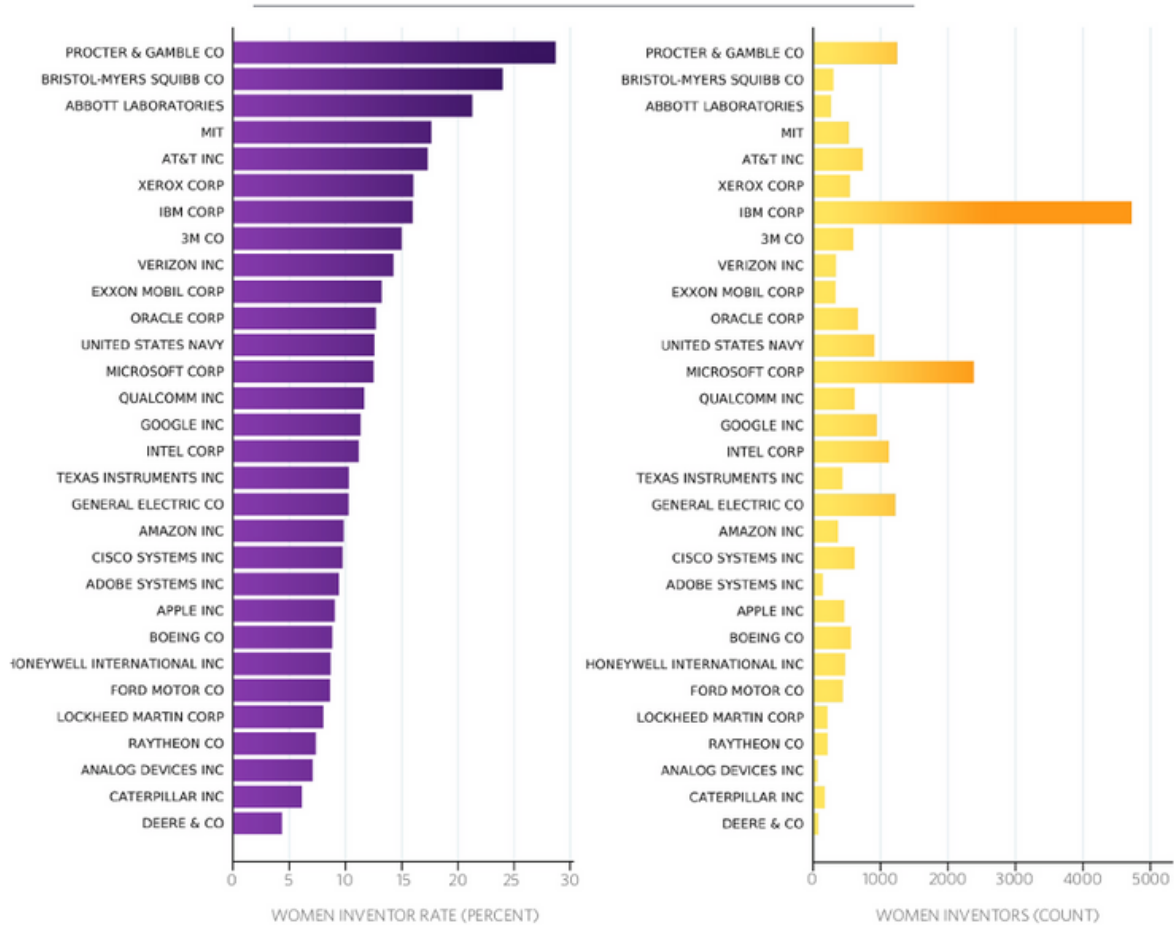
Culture/Environment-Related Root Causes

- Invention Submission / Patenting Process is Bureaucratic, Intimidating, or Unclear
- Patenting Process Not Known
- No Organization Doesn't Support or is Not Welcoming to Female or Diverse Inventors
- Patenting / Leaky Pipeline

Root Cause Summary

- Inventors at named inventors
- Female and Diverse Employees are Not on Programs with High Likelihood of Patent Filing
- IP Professionals' Inattention and/or Ignorance
- Attorneys/Agents Interfering w/ The Busy
- Invention Submission / Patenting Process is Bureaucratic, Intimidating, or Unclear
- Patenting Process Not Known
- No Organization Doesn't Support or is Not Welcoming to Female or Diverse Inventors
- Patenting / Leaky Pipeline

Figure 7. Women Inventors at Select Top Patent Assignees, 2007-2016



[18] [USPTO Progress and Potential](#)

Sample Survey
Gender Diversity in Innovation Survey¹⁹

Scale of 1 (disagree completely) to 5 (agree completely)

1. Women and men are equally likely to be inventors on patent applications
In the company
In my specific business/laboratory

2. Women and men are equally assigned to innovative projects that lead to patenting:
at the company
in my specific business/laboratory

3. Submitting ideas for patents is an important part of my job.
If I am a manager, submitting ideas for patents is an important part of my employees' time.

4. Going through the patenting process is a good use of my time.
If I am a manager, going through the patenting process is a good use of my employees' time.

5. I will submit an idea for patenting even if I am not completely sure if it is patent worthy (meaning that I'm not sure if it's ground-breaking enough and/or I'm not sure if I have enough data to support a filing).

6. I know the process to submit an idea for patenting.
Rate your satisfaction with the process.
Rate whether the process is fair and unbiased/inclusive.

7. I have access to at least 1 person who I can talk to about whether an idea should be submitted for patenting.
I contact that person when I have an idea.

8. Women and men who have submitted inventions for consideration for patenting are positively and publicly recognized for having done so.

[19] Survey prepared by: Ahsan Shaikh | Partner at McDermott Will & Emery | available at ashaikh@mwe.com

9. Women and men who have been listed on inventors of patent applications are positively and publicly recognized for having done so.

10. Women and men who have issued patents are positively and publicly recognized for having done so.

11. I have worked on a project on which patent applications were filed. If no, skip question.

Rate your satisfaction with being included/not included on the patent application.

Rate your satisfaction with being included by the attorney/agent.

Rate your satisfaction with being recognized by your immediate boss.

Rate your satisfaction with being recognized by the lab.

12. Do you have any other thoughts you'd like to share? [[Fill in box.]]

13. Can we follow-up with you to talk more in a small group or 1:1 about this issue?
Yes/No

Sample Survey 2

*Survey for Underrepresented Inventor Populations*²⁰

Questions are of either [Yes-No] or [Scale Of 1 (disagree completely) to 5 (agree completely)]

EXAMPLE: Gender Parity (but could be modified for any type of diversity)

1. Women and men are equally assigned to innovative projects or features at [COMPANY]
2. Management at [COMPANY] supports improving the representation of women in the patenting program at [COMPANY]. (1 to 5)
3. Submitting ideas for patents is an important part of your job at [COMPANY] (1 to 5)
4. Going through the patenting process is a good use of your time (1 to 5)
5. Ideas should be groundbreaking in order to apply for a patent (1 to 5)
6. I will submit an idea for patenting even if I am not completely sure if it is patent worthy (1 to 5)
7. I know where to go or who to contact in order to submit an idea for patenting at [COMPANY] (Y/N)
8. The current incentive for submitting a patent application is _____. Is this an incentive you'd be interested in?
9. Men and women are equally likely to be an inventor on a patent application at [COMPANY] (1 to 5)
10. Do you know any women inventors at [COMPANY]?
11. Have you worked on a project or feature that has been the subject of a patent application?
 - a. If YES:
 - i. Were you listed as an inventor?
 - ii. Your experience with the patent attorney/agent was positive (1 to 5)
 - iii. Being listed as an inventor for the patent application was a positive experience (1 to 5)
12. I have a mentor who has submitted a patent application before.
13. Do you have any other thoughts you'd like to share?
14. Can we follow-up with you to talk more in a small group or 1:1 about this issue?

Consider asking, while attempting to maintain anonymity:

- Ask person to self-identify gender, # years at company, what division/tech area you are in, ethnicity, and age range.

[20] Survey prepared by: Ahsan Shaikh | Partner at McDermott Will & Emery | available at ashaikh@mwe.com

Sample IDF

Information Disclosure Form

PRIVILEGED AND CONFIDENTIAL
REQUEST FOR LEGAL ADVICE OR SERVICES

INVENTION DISCLOSURE FORM

Dear Inventor:

Thank you for your interest in submitting an idea for patent consideration. Patents help us protect the invention(s) you worked on. Please answer as many of the following questions as best as possible.

If you have questions on how to complete this form, please contact [name] for support.

We appreciate your input.

Regards,
Intellectual Property Team

STEP 1 -- Please describe the technology and the problem it solves
(REQUIRED. Recommend length: ~3-5 sentences)

1. Summary: Please provide a brief summary of the new Technology
2. Problem: What is the problem you are trying to solve with the new technology?
3. Solution: How does the new technology solve the problem?
4. Benefits: What are the commercial opportunities and why is the new Technology good for [company name]? [e.g., What are the commercial opportunities and how does the new Technology contribute to them?]
5. Different: How is the new technology better or different than existing technologies?
6. Additional Technology Background: What are the other existing technologies (patent applications, publications) that you know of?

PRIVILEGED AND CONFIDENTIAL
REQUEST FOR LEGAL ADVICE OR SERVICES

STEP 2 – Please list any known (planned or existing) disclosures
(REQUIRED. Recommend length: ~2-3 sentences)

1. Disclosures: Report any existing or planned disclosures (e.g. publications, customer demonstrations, industry events) or commercial uses of the Technology. If unknown or not sure, please leave blank.
2. If you answered yes to question 1, when will/did the disclosure described above occur?
3. Are you working (or have you worked) with any third parties (parties not employed by the company) or used any government funding to develop or invent the new technology? If unknown or not sure, please leave blank.

STEP 3 – Please explain who has been involved in the development of technology
(OPTIONAL. Recommended length: ~10 words)

1. What is the primary department/region/country where this invention originated/developed?
2. Which business was the technology developed for?
3. Could other businesses benefit from the technology?
4. Additional remarks/project names related to this technology

PRIVILEGED AND CONFIDENTIAL
REQUEST FOR LEGAL ADVICE OR SERVICES

STEP 4 – Please list known inventors
(REQUIRED)

1. IDF Attorney/Agent: if you are already working with a lawyer or patent agent on this technology, please provide their name below:

_____.

2. Please provide your information.

Legal First/Last Name _____

Department: _____

Contact information: _____

3. Please provide any additional inventors that you know of who worked on this technology. Please leave blank if unknown.

Legal First/Last Name _____

Department: _____

Contact information: _____

STEP 4 – 5 – Submit Supporting Documents

(OPTIONAL but preferred; further search not required)

Please list relevant documents to be submitted with this disclosure (e.g. experimental reports, background art, relevant joint development agreements). You can include PPT presentations, CADs, pictures, developed figures, pictures, flowcharts, etc.

STEP 6 – Provide Proposed Title of Invention (OPTIONAL)

Step 7 – Please review and submit to IP Department (or save draft)

SAMPLE