

# **Policy Approaches to Close the Intellectual Property Gender Gap - Practices to Support Access to the Intellectual Property System for Female Innovators, Creators and Entrepreneurs<sup>1</sup>**

Prepared by Jennifer Brant, Kaveri Marathe, Jaci McDole, Mark Schultz

2019

---

<sup>1</sup> This document has been prepared in the context of the Development Agenda Project on [“Increasing the Role of Women in Innovation and Entrepreneurship, Encouraging Women in Developing Countries to Use the Intellectual Property System”](#).

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	4
1.0 INTRODUCTION.....	5
2.0 BACKGROUND: THE CURRENT SITUATION FOR WOMEN'S ACCESS TO AND PARTICIPATION IN THE IP SYSTEM.....	7
3.0 FIVE CHALLENGES CONTRIBUTING TO THE IP GENDER GAP .....	10
3.1 CHALLENGE: MORE DATA IS NEEDED TO UNDERSTAND THE SCOPE AND NATURE OF THE IP GENDER GAP.....	10
3.2 CHALLENGE: WOMEN ARE LESS LIKELY TO BE ENCOURAGED AND TRAINED TO ENTER STEM FIELDS. THEY ARE ALSO LESS LIKELY TO RECEIVE THE RESOURCES THEY NEED TO SUCCEED IN BUSINESS. ....	12
3.3 CHALLENGE: WOMEN ARE LESS LIKELY TO ENTER CAREERS IN IP LAW AND ADMINISTRATION.....	14
3.4 CHALLENGE: THERE IS A GENERAL LACK OF UNDERSTANDING OF THE VALUE OF IP RIGHTS AND HOW THE IP SYSTEM WORKS. ....	14
3.5 CHALLENGE: WOMEN ARE LESS LIKELY TO RECEIVE MENTORING AND OPPORTUNITIES FOR ADVANCEMENT IN IP-INTENSIVE FIELDS.....	16
4.0 SOLUTIONS AND POLICIES TO ADDRESS THE IP GENDER GAP .....	19
4.1 COLLECTING MORE DATA TO UNDERSTAND THE SCOPE AND NATURE OF THE IP GENDER GAP .....	19
4.2 ENCOURAGING AND TRAINING MORE WOMEN TO ENTER STEM FIELDS AND PROVIDING THE RESOURCES THEY NEED TO SUCCEED IN BUSINESS. .	21
4.3 ENCOURAGING WOMEN TO ENTER CAREERS IN IP LAW AND ADMINISTRATION .....	28
4.4 HELPING WOMEN TO UNDERSTAND THE VALUE OF IP TO THEIR WORK AND HOW TO USE THE SYSTEM.....	29
4.5 PROVIDING WOMEN WITH MENTORING AND OPPORTUNITIES FOR ADVANCEMENT IN IP-INTENSIVE FIELDS .....	34
5. 0 CONCLUSION.....	38
BIBLIOGRAPHY.....	40

Case Studies	
Case study: Collecting information about gender data collection practices .....	20
Case study: Encouraging young women to enter STEM fields .....	26
Case study: Training women to enter careers in IP.....	28
Case study: Showcasing female inventors to encourage use of the IP system .....	31
Case study: Providing IP capacity-building to female artisans in rural Kenya .....	33
Case study: Providing women with networking, mentoring and .....	37
advancement opportunities .....	37

## EXECUTIVE SUMMARY

Research indicates that women are not participating in the IP system at the same rates as men, and that the relative deficit in access to the intellectual property (IP) system by women is present across all forms of IP rights. Solving this problem has the potential to greatly benefit individual women and businesses, as well as societies at large. At the individual level, increasing women's access to the IP system can have such benefits as increased pay, better professional opportunities, and increased visibility within their fields. In terms of the societal level, one study has estimated that closing the gender gap with regard to patents could increase a nation's GDP by 2.7 per cent.

Though the initial goal of this report was to identify "best practices," in terms of policies and other initiatives that can enhance access to the IP system by women, the authors found that there are not yet proven best practices as such. Rather, there are a number of promising programs for the advancement of women in terms of their engagement with the IP system. Certain of these programs are described in the paper, along with possible next steps that governments can take to surmount the barriers.

This report identifies five challenges contributing to the IP gender gap, and proposes solutions and policies targeted at each of them. The five challenges identified are:

1. A lack of data needed to understand the scope and nature of the gender gap;
2. The fact that women are less likely to be encouraged and trained to enter science, technology, engineering and mathematics (STEM) fields, as well as less likely to receive the resources they need to succeed in business;
3. The fact that women are less likely to enter careers in IP law and administration;
4. A general lack of understanding of the value of IP rights and of how the IP system works; and
5. The fact that women are less likely to receive mentoring and opportunities for advancement in IP-sensitive fields.

Among the corresponding possible solutions – emerging best practices - are, respectively:

1. Determining with greater certainty what data is being collected, as well as what challenges stand in the way of data collection;
2. Promoting programs for girls, adult women, and educators that encourage female engagement with IP, as well as STEM grants and scholarships, internships and mentoring, academic research funding, investment capital for female entrepreneurs, and fundamental capacity building;
3. Increasing the number of female IP law and administration professionals indirectly by focusing on increasing the number of female STEM professionals, as well as creating targeted programs for the training of women for IP law and administration careers;
4. Promoting awareness-raising and targeted capacity-building programs; and
5. Providing networking and mentoring opportunities, supporting women's ability to both succeed and remain in IP-intensive careers, and encouraging women to commercialize their inventions.

## 1.0 INTRODUCTION

Over the past 50 years, women have entered the workforce at all levels in ever greater numbers. This trend has been accelerated in part by government policies, and with good reason: studies show that including women equally in the formal economy could spur growth in gross domestic product (GDP) by 26 per cent.<sup>2</sup> To obtain the full benefit of women's participation in the workforce, however, women must be able to secure the fruits of their innovative and creative labors, especially as intangible value now makes up an ever increasing part of business value and investment. Access to and the effective use of intellectual property rights (IPRs) will be critical to women's ability to capitalize on this value.

Despite the importance of women participating fully in all aspects of economic activity, previous research has shown that women are neither participating in the intellectual property (IP) system at the same rates as men, nor receiving the same benefits. In short, there is an IP gender gap. For example, although women account for roughly half of the global labor force<sup>3</sup> and more than half of college graduates worldwide,<sup>4</sup> they receive far fewer patents than men.

The IP gender gap has been documented in a growing number of studies. In 2016, a worldwide study for the World Intellectual Property Organization (WIPO) on gender in patenting found that 29 per cent of Patent Cooperation Treaty (PCT) filings from 1995 to 2015 listed women inventors, although there was significant variation among countries and the rate rose over time.<sup>5</sup> Only 5 per cent of applications listed women inventors exclusively.<sup>6</sup> A 2019 study by the United States Patent and Trademark Office (USPTO) found that "the percentage of all patent inventors that are women, or the annual 'women inventor rate', reached only 12 per cent in 2016".<sup>7</sup> The same study found that the proportion of patents with at least one woman inventor reached about 21 per cent in 2016.<sup>8</sup> A study by the Organisation for Economic Cooperation and Development (OECD) found similar statistics for the G20 as a whole in 2014, with just 8.4 per cent of patents having at least one woman inventor in 2014.<sup>9</sup> A study by the United Kingdom IP Office (UK IPO) found that, globally, the share of woman inventors was just 12.7 per cent in 2017, with the global percentage of patents with at least one woman inventor at 21 per cent that same year.<sup>10</sup> Although the UK IPO data shows that the share of woman inventors has doubled over the past 20 years from 6.8 per cent in 1998 to 12.7 per cent in 2017, that rate of growth would not

---

<sup>2</sup> McKinsey Global Institute. "The Power of Parity: How Advancing Women's Equality Can Add \$12 Trillion to Global Growth." *mckinsey.com*. Sep. 1, 2015. Web. <<https://www.mckinsey.com/featured-insights/employment-and-growth/how-advancing-womens-equality-can-add-12-trillion-to-global-growth>>.

<sup>3</sup> Catalyst. "Women in the Workforce – Global: Quick Take." *catalyst.org*. Jan. 30, 2020. Web. <<https://www.catalyst.org/research/women-in-the-workforce-global/>>.

<sup>4</sup> Organisation for Economic Cooperation and Development (OECD). "Gender Equality: Gender Gap in Education." *oecd.org*. Mar. 2016. Web. <<https://www.oecd.org/gender/data/gender-gap-in-education.htm>>.

<sup>5</sup> Martinez, G.L., Raffo, J. and Saito, K. "Economic Research Working Paper No. 33: Identifying the gender of PCT inventors." *wipo.int*. World Intellectual Property Organization (WIPO), Nov. 2016. Web. Mar. 18, 2019. <[https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_econstat\\_wp\\_33.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_econstat_wp_33.pdf)>.

<sup>6</sup> *Ibid.*

<sup>7</sup> United States Patent and Trademark Office (USPTO), Office of the Chief Economist. "Progress and Potential: A Profile of Women Inventors on U.S. Patents." *uspto.gov*. 2019. Web. <<https://www.uspto.gov/sites/default/files/documents/Progress-and-Potential.pdf>>. The report states that: "The women inventor rate is the percent of unique women inventors across all patents granted in a given year," p. 4.

<sup>8</sup> *Ibid.*

<sup>9</sup> OECD. "Empowering Women in the Digital Age: Where Do We Stand?" *oecd.org*. OECD Directorate for Science, Technology and Innovation, 2018. Web. <<https://www.oecd.org/social/empowering-women-in-the-digital-age-brochure.pdf>>.

<sup>10</sup> United Kingdom Intellectual Property Office. "Gender profiles in worldwide patenting: An analysis of female inventorship." *gov.uk*. Oct. 2, 2019. Web. <<https://www.gov.uk/government/publications/gender-profiles-in-worldwide-patenting-an-analysis-of-female-inventorship-2019-edition>>.

achieve gender parity until 2070 unless something changes (assuming, even, that progress continues at a steady rate).<sup>11</sup> Although data on women obtaining and using other types of IPRs is scarcer, data and case studies indicate that women’s engagement with all forms of IPRs remains unequal.<sup>12</sup>

As an empirical matter, the existence of an IP gender gap has become clear. As one researcher put it upon surveying the evidence regarding a gender gap in patents:

“Women are at every level pervasively absent from the patent system. In the United States, far fewer patent attorneys and patent agents are women than are men. Woman inventors account for a relatively small proportion of patent applications, even when counted as co-inventors as part of an inventive team. This female deficit holds true at every career stage and has remained persistent over time, with only small recent increases in female inventorship. This discrepancy in inventorship is not limited to the United States; a number of studies indicate that it is found consistently across multiple jurisdictions.”<sup>13</sup>

WIPO has committed to promoting gender equality and women’s empowerment in and through IP protection. The WIPO Secretariat has been actively engaged in studying the IP gender gap and ways to address it. In addition to highlighting women inventors and creators during the 2018 World Intellectual Property Day, the Office of the Chief Economist developed gender equality indicators that are reflected in WIPO reports including, for instance, the PCT Yearly Review. Capacity-building activities that target women in particular are organized regularly, and communications strategies consistently include a gender angle. Recently, WIPO commissioned studies on the IP gender gap, including a literature review, to improve understanding of the challenges facing women inventors and innovators.<sup>14</sup>

WIPO commissioned the present study to identify policies that have advanced the use of the IP system by women. This study considers the full range of registered and unregistered IP rights, although it draws mostly on evidence regarding the patent system as that is where most research and capacity-building work has been focused. The hope was to identify “best practices” in IP policymaking that empower women – in other words, a set of policies that have been tried and tested, and that have succeeded, in countries in different regions and at different levels of development. While the authors were able to identify beneficial policies in several countries that have been tried, the goal of finding policies that were sufficiently established and tested to be called “best practices” proved too ambitious. In hindsight, the very fact that there is such a significant IP gender gap, which is improving only slowly, might lead one to expect that there may be a dearth of widespread, effective policies to remedy it. Indeed, that appears to be the case.

Nevertheless, our research revealed there are many instances of programs that address the IP gender gap that deserve to be highlighted. A few have proven to be effective and productive in diverse circumstances over time, and many others offer promising models. We discuss and assess these programs in this report.

---

<sup>11</sup> Guibourg, C. and Stylianou, N. “Why are so few women inventors named on patents?” *bbc.com*. BBC News, Oct. 2, 2019. Web. <<https://www.bbc.com/news/technology-49843990>>.

<sup>12</sup> Bartow, A. “Patent Law, Copyright Law, and the Girl Germs Effect.” *St. John’s Law Review* 90 (2016): pp. 579-608. Web. Apr. 3, 2019. <[https://scholars.unh.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1260&context=law\\_facpub](https://scholars.unh.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1260&context=law_facpub)>.

<sup>13</sup> Burk, D.L. “Diversity Levers.” *Duke Journal of Gender Law & Policy* 23.1 (2015): pp. 31-32. Print.

<sup>14</sup> Cutura, J. *Challenges for Women Inventors and Innovators in Using the Intellectual Property System: A Review of Literature*. WIPO, forthcoming, 2019.

Given the limited number of policies in existence, this report relied on a variety of sources to find examples of productive policies. These sources included interviews, websites of organizations, academic papers, government, reports of think tanks and non-profit organizations, and case studies shared in correspondence with officials, experts and stakeholders.

## **2.0 BACKGROUND: THE CURRENT SITUATION FOR WOMEN'S ACCESS TO AND PARTICIPATION IN THE IP SYSTEM**

Understanding of how national IP systems might better serve and include women is presently at an early stage. Enough is known to say that there is a gap between the rates at which men and women obtain patents and other IPRs, and the rates at which they participate in the most lucrative inventive and creative activities. There is evidence that national economies could benefit greatly from closing this gap. This paper identifies some promising approaches that have been tried with the aim of increasing the participation of women in the IP system. However, we still lack comprehensive, global and detailed data about their participation. This is the case even in relation to patents, which have been the subject of more gender-based scrutiny than other forms of IP rights. We also cannot say that any particular approach to including women in the IP system has been sufficiently well established, tested and evaluated as to constitute a “best practice”.

One of the biggest challenges for researchers working to understand and quantify how well the IP system serves women throughout the world is a lack of data. Neither patent nor trademark applications request information regarding the gender of the applicant. Researchers have reverse engineered estimates of women inventors on patent applications by categorizing inventors based on the gender traditionally associated with the names of applicants.<sup>15</sup> However, this approach likely misses some women and includes some men with unisex names. For IP rights such as copyright that are not necessarily registered, accurately assessing the gender gap can be even more challenging.

Despite the lack of comprehensive and precise data on women's participation in the IP system, research shows that there is certainly a large gap between the rates at which women and men participate in the IP system.<sup>16</sup> There is also research that indicates that the patenting gender gap persists within organizations, such as corporations and universities, even when women make up roughly half of the organization.

Curiously, women's engagement with the IP system differs according to context. Women tend to register more patents in university settings than in industry settings,<sup>17</sup> and tend to use patents to commercialize their innovations in industrial settings more than in academia.<sup>18</sup> Commercialization, the process by which inventions are introduced into the marketplace, is relevant when examining women's participation in the IP system because this is the context in which IPRs are used to

---

<sup>15</sup> See, for example., Williams-Baron, E., Milli, J. and Gault, B. “Innovation and Intellectual Property among Women Entrepreneurs.” *iwpr.org*. Institute for Women's Policy Research, Sep. 6, 2018. Web. Mar. 20, 2019. <[https://iwpr.org/wp-content/uploads/2018/07/C472\\_Report-Innovation-and-Entrepreneurship-9.6.18-clean.pdf](https://iwpr.org/wp-content/uploads/2018/07/C472_Report-Innovation-and-Entrepreneurship-9.6.18-clean.pdf)>.

<sup>16</sup> Cutura, 2019.

<sup>17</sup> Sugimoto, C.R., Ni, C., West, J.D. and Larivière, V. “The Academic Advantage: Gender Disparities in Patenting.” *PLoS ONE* 10.5 (2015). Web. <<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0128000>>.

<sup>18</sup> Demiralp, B., Morrison, L.T.R. and Zayed, S. “On the Commercialization Path: Entrepreneurship and Intellectual Property Outputs Among Women in Stem.” *Technology and Innovation* 19.4 (2018): pp. 707-726. Web. Mar. 1, 2019. <<https://www.ingentaconnect.com/content/nai/ti/2018/00000019/00000004/art00007>>.

preserve the innovator's competitive advantage. One hypothesis explaining this difference is that the corporate sector better incentivizes commercialization through bonuses and promotions.<sup>19</sup>

Although the research reveals a gender gap in the use of the IP system and in entrepreneurship, it also reveals some positive trends and progress. A few promising statistics include the following:

- Women becoming business owners more frequently.<sup>20</sup>
- Women registering copyrights in the United States at higher rates over time.<sup>21</sup>
- Women-owned businesses growing faster than male-owned ones.<sup>22</sup>
- Women working in tech-intensive fields patenting more than women in other fields.<sup>23</sup>
- Patents with at least one woman inventor tending to have more co-inventors on average, with more interdisciplinary teams, suggesting a higher level of collaboration by women inventors.<sup>24</sup>
- Data in some countries indicating that the number of trademarks registered by women is growing over time; for instance, in Peru, there were 2,044 in 2015 and 3,111 in 2018.<sup>25</sup>
- In the United States, the percentage of patents with at least one woman inventor having tripled over the course of 40 years, growing from about 7 per cent in the 1980s to about 21 per cent in 2016.<sup>26</sup>

In addition, a few countries stand out as having reached or nearly reached gender parity in patenting, specifically China and the Republic of Korea. These countries could serve as examples as we further explore the key policies put in place to support women innovators on their path to patenting.

A gender gap in IP protection matters because IP contributes to the success of individual companies and national economies. While the importance of IP in the modern economy is well known, a few facts nonetheless bear consideration. The majority of the value of leading businesses now lie in intangible assets, in contrast to a few decades ago when business value consisted largely of tangible capital.<sup>27</sup> In developed economies, the majority of new business investment is in intangibles, and the main intangible asset is IP.<sup>28</sup> Moreover, the ability of an entrepreneur to secure IP protection can be a deciding factor in whether an investor funds that start-up.<sup>29</sup> The gender gap in patenting can make it more difficult for women entrepreneurs to

---

<sup>19</sup> *Ibid.*

<sup>20</sup> Williams-Baron, et al., *op cit.*, 2018.

<sup>21</sup> Brauneis, R. and Oliar, D. "An Empirical Study of the Race, Ethnicity, Gender and Age of Copyright Registrants." *The George Washington Law Review* 86.1 (2018): pp. 101-154. Web. <[https://www.law.nyu.edu/sites/default/files/upload\\_documents/Brauneis%20and%20Oliar.pdf](https://www.law.nyu.edu/sites/default/files/upload_documents/Brauneis%20and%20Oliar.pdf)>.

<sup>22</sup> *Ibid.*

<sup>23</sup> USPTO, *op cit.*, 2019.

<sup>24</sup> Sugimoto, et al., *op cit.*, 2015.

<sup>25</sup> INDECOPI. "Prácticas para Promover el Uso de la Propiedad Intelectual en las Mujeres Innovadoras." 2018. Provided to the authors by the Government of Peru, Oct. 2019.

<sup>26</sup> USPTO, *op cit.*, 2019.

<sup>27</sup> Corrado, C.A., Hulten, C. and Sichel, D. "Intangible Capital and U.S. Economic Growth." *The Review of Income and Wealth* 55.3 (2009): pp. 661-685, 671. Print.

<sup>28</sup> Corrado C.A. Barnes, P. and McClure, A. "Investments in Intangible Assets and Australia's Productivity Growth." (Productivity Commission Staff, Working Paper). *pc.gov.au*. Australian Government Productivity Commission, 2009: p. 73. Web. <<http://www.pc.gov.au/research/supporting/intangible-investment/intangible-investment.pdf>>.

<sup>29</sup> Graham, S.J.H., Merges, R.P., Samuelson, P. and Sichelman, T.M. "High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey." *Berkeley Technology Law Journal* 24.4 (2009): pp. 255-327, 287-309. Print.



obtain investment.<sup>30</sup> In fact, investment in start-ups is heavily weighted towards male entrepreneurs,<sup>31</sup> with women receiving just 2.2 per cent of American venture capital in 2018.<sup>32</sup> Finally, firms with patents, copyrights or trademarks all have higher revenues than those without any IP assets.<sup>33</sup>

Correcting the gender gap in IP protection is important not only to engage half the population, currently at a disadvantage, but also for the benefit of society at large. The lower level of participation by women in the IP system represents a missed opportunity for both individuals and national economies. One study estimates that closing just the patenting gender gap could increase GDP by 2.7 per cent.<sup>34</sup>

On the individual level, increasing women's access to IP rights can have both tangible and intangible benefits in the form of increased pay, preferential treatment, better professional opportunities and increased public visibility.<sup>35</sup> On a wider scale, increasing women's access to IPRs can have knock-on effects throughout society. At a basic level, society is losing out on opportunities to advance science and technology because women's contributions are being undervalued. At the level of businesses, companies could improve their financial performance through more gender-diverse teams.<sup>36</sup> Research suggests that not only is it fair to improve gender equality in the workplace, but also that there is a business case for supporting women entrepreneurs, creators and innovators. As one scholar puts it, "[i]nclusion in the production of innovation supports entry, social mobility and the design of products that address the problems faced by a diverse set of consumers".<sup>37</sup>

Historically, even though women expressed creativity and innovative thinking alongside men, these efforts were often not rewarded, or the benefits accrued to men. For example, when Sybilla Masters devised a new way to process corn in 1715, the rights to the patent were assigned to her husband<sup>38</sup> because married women could not legally own such property in England – where the patent was obtained – until the extension of the Married Women's Property Act in 1882.<sup>39</sup> Even today, women in many places still face de facto discrimination and, as a result, may own fewer assets such as land and property despite laws providing for equal rights.<sup>40</sup> This sort of discrimination is why successful authors such as Amantine Lucile Aurore Dupin (a.k.a. George

---

<sup>30</sup> Marcowitz-Bitton, M., Kaplan, Y. and Morris, E.M. "Unregistered Patents & Gender Equality." *Harvard Journal of Law & Gender* 43.1 (forthcoming, 2019). Web. <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3502178](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3502178)>. The authors argue that lower success rates among start-ups run by women entrepreneurs can be attributed to the IP gender gap.

<sup>31</sup> Demiralp, et al., *op cit.*, 2018.

<sup>32</sup> Marakar, S. "When Women Control the Money, Female Founders Get Funded." *New York Times*. Mar. 1, 2019. Web. <<https://www.nytimes.com/2019/03/01/business/female-founders-venture-capital.html>>.

<sup>33</sup> Williams-Baron, et al., *op cit.*, 2018.

<sup>34</sup> Fechner, H. and Shpanka, M.S. "Closing Diversity Gaps in Innovation: Gender, Race, and Income Disparities in Patenting and Commercialization of Inventions." *Technology and Innovation* 19.4 (2018): pp. 727-734. Web. Apr. 1, 2019. <[https://www.cov.com/-/media/files/corporate/publications/2018/06/closing\\_diversity\\_gaps\\_in\\_innovation\\_gender\\_race\\_and\\_income\\_disparities\\_in\\_patenting\\_and\\_commercialization\\_of\\_inventions.pdf](https://www.cov.com/-/media/files/corporate/publications/2018/06/closing_diversity_gaps_in_innovation_gender_race_and_income_disparities_in_patenting_and_commercialization_of_inventions.pdf)>.

<sup>35</sup> Kahler, A.I. "Examining Exclusion in Woman-Inventor Patenting: A Comparison of Educational Trends and Patent Data in the Era of Computer Engineer Barbie." *American University Journal of Gender Social Policy and Law* 19.3 (2011): pp. 773-798. Web. Mar. 12, 2019. <<https://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1522&context=jgspl>>.

<sup>36</sup> Mertens, E. "International Women's Day: IP Counsel Reflect on Gender Challenges and Progress." *managingip.com*. Managing Intellectual Property, Mar. 8, 2019. Web. Mar. 12, 2019. <<https://www.managingip.com/Article/3863249/Managing-Patents-Archive/International-Womens-Day-IP-counsel-reflect-on-gender-challenges-and-progress.html>>.

<sup>37</sup> CHIEN, C.V. "INEQUALITY, INNOVATION, AND PATENTS." SANTA CLARA UNIV. LEGAL STUDIES RESEARCH PAPER NO. 2018-03 (2018). WEB. <[HTTPS://PAPERS.SSRN.COM/SOL3/PAPERS.CFM?ABSTRACT\\_ID=3157983](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3157983)>.

<sup>38</sup> Burk, D.L. "Bridging the gender gap in intellectual property,." *wipo.int*. WIPO Magazine, Apr, 2018. Web. Mar. 28, 2019. <[https://www.wipo.int/export/sites/www/wipo\\_magazine/en/pdf/2018/wipo\\_pub\\_121\\_2018\\_02.pdf](https://www.wipo.int/export/sites/www/wipo_magazine/en/pdf/2018/wipo_pub_121_2018_02.pdf)>.

<sup>39</sup> United Kingdom Parliament. "Marriage: property and children." *parliament.uk*. Web. Aug. 15, 2019. <<https://www.parliament.uk/about/living-heritage/transformingsociety/private-lives/relationships/overview/propertychildren/>>.

<sup>40</sup> Stand for Her Land Campaign. "Homepage." Web. Aug. 15, 2019. <<https://stand4herland.org>>.

Sand), Louisa May Alcott (a.k.a. A. M. Barnard), J.K. Rowling (a.k.a. Robert Galbraith) and the Brontë sisters (a.k.a. Currer, Ellis and Acton Bell) chose to write under male or gender-ambiguous pen names.

The accumulation of such barriers over time has resulted in women lagging behind men across numerous indicators, from financing to business ownership to patenting. Even though they express creativity and innovative thinking equally with men, women historically did not, and in many cases still do not, equally reap the material benefits and other rewards associated with their labor.

### **3.0 FIVE CHALLENGES CONTRIBUTING TO THE IP GENDER GAP**

If a problem is caused by a single, obvious challenge, finding a solution is likely to be relatively simple. As with most challenging social problems, however, the IP gender gap stems from a number of interrelated and wide-reaching challenges that arise at many levels. Like a leaking pipe with many holes, each of these challenges must be addressed before positive results will become visible at the end of the pipeline. For policy initiatives to be most effective, it is important to understand the many interrelated factors that inhibit women entrepreneurs, creators and innovators from fully engaging with IP systems.<sup>41</sup>

This section addresses the challenges contributing to the IP gender gap. As previous research has been conducted on the IP gender gap, including on behalf of WIPO,<sup>42</sup> this discussion summarizes and categorizes the challenges, rather than providing a comprehensive overview.

This section identifies five groups of challenges that correspond to five groups of policies designed to address them, to be discussed in section 4.0. The challenges include the following:

1. More data is needed to understand the scope and nature of the IP gender gap.
2. Women are less likely to be encouraged and trained to enter science, technology, engineering and mathematics (STEM) fields. They are also less likely to receive the resources they need to succeed in business.
3. Women are less likely to enter careers in IP law and administration.
4. There is a general lack of understanding among innovators, creators and entrepreneurs of the value of IP rights and how the IP system works.
5. Women are less likely to receive the same mentoring and opportunities as men for advancement in IP-intensive fields.

#### **3.1 CHALLENGE: MORE DATA IS NEEDED TO UNDERSTAND THE SCOPE AND NATURE OF THE IP GENDER GAP.**

---

<sup>41</sup> See Bair, S.P. "Impoverished IP." *Ohio State Law Journal* (forthcoming, 2019). Bair discusses how IP policies alone may not encourage greater participation in innovative activities until other issues limiting capacity have been addressed.

<sup>42</sup> Cutura, *op cit.*, 2019.

One reason that global society is in the early stages of addressing the IP gender gap is that in most places the data that would help to define and understand the problem more fully are not collected. We therefore simply do not have enough detailed information to draw clear conclusions about challenges, solutions and trends over time.<sup>43</sup> This is the case across all types of IP rights and all national, regional and global IP systems.

The reasons for this lack of data are varied and sometimes difficult to address. For example, under the Berne Convention for the Protection of Literary and Artistic Works, copyright protection is granted upon the creation of a finished work, regardless of registration (if registration is even available, which is not the case in most countries). This regime makes copyright status difficult to track, thus complicating efforts to determine the author's gender.<sup>44</sup> In addition, IP offices typically do not ask applicants about their gender when they apply for patents and trademarks.<sup>45</sup> More generally, research on women and IPRs is underdeveloped at present.

There are data sets that address women's entrepreneurship more generally, rather than IP usage specifically. However, many of these data sets are imprecise, as they tend to be based on self-reported information, do not differentiate by business structure, such as LLC or Corporation, and vary widely between countries according to definitions of key terms.<sup>46</sup> For example, the OECD defines entrepreneurs as "people who own and work in their own business, including unincorporated businesses and own-account workers", while the United Nations Statistics Division defines entrepreneurs as "persons who have direct control over an enterprise they own alone or with other individuals".<sup>47</sup> Subtle differences in definitions, such as whether the business is co-owned or registered, can lead to misalignment in data sets, skewing comparisons. Further disaggregated data is also needed on mixed-gender patenting teams.

Data is also not being captured on patent attorneys or patent examiners. The USPTO, for example, does not require incoming examiners to declare their gender. It is unclear whether gender influences an applicant's success, but some evidence shows that examiners tend to exhibit bias against female applicants, expressing "disdain" for inventions by women and even foregoing giving female applicants the feedback that is offered to male applicants.<sup>48</sup>

Some research has been done with respect to IP usage by women in academia, but IP usage by gender in corporations is less studied. For example, the private sector produces more than 80 per cent of PCT applications every year,<sup>49</sup> while 28 per cent of United States copyright registrations originate from the corporate sector.<sup>50</sup>

Having sufficiently detailed data collected using universally agreed metrics would enable governments and institutions to better understand the barriers women face when starting and growing IP-based businesses so that such barriers can be addressed with policy solutions.

---

<sup>43</sup> Kahler, *op cit.*, 2011.

<sup>44</sup> Burk, *op cit.*, 2018.

<sup>45</sup> Kahler, *op cit.*, 2011.

<sup>46</sup> Meunier, F., Krylova, Y. and Ramalho, R. "Women's Entrepreneurship: How to Measure the Gap between New Female and Male Entrepreneurs?" *worldbank.org*. World Bank, Nov. 2017. Web. Mar. 15, 2019. <<http://documents.worldbank.org/curated/en/704231510669093889/pdf/WPS8242.pdf>>.

<sup>47</sup> *Ibid.*

<sup>48</sup> Kahler, *op cit.*, 2011.

<sup>49</sup> WIPO. "Patent Cooperation Treaty Yearly Review 2019." *wipo.int*. 2019. Web. <[https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_901\\_2019.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2019.pdf)>.

<sup>50</sup> Brauneis and Oliar, *op cit.*, 2018.

However, there is an important caveat to this point regarding data-collection: IP offices and applicants worry that asking about the demographic information of IP applicants might bias examiners,<sup>51</sup> and, based on historical trends, this is a valid concern.<sup>52</sup>

One approach to addressing this problem of implicit bias could be to anonymize patent applications in order to reduce any unconscious bias that may arise when an examiner learns an applicant's name.<sup>53</sup> Prompted by the SUCCESS Act, the USPTO recently asked for comments on whether it should collect demographic information about patent applicants. The IP Section of the American Bar Association encouraged the USPTO to collect such information, but raised concerns about implicit bias affecting applicants. The IP Section stated that it believed that "this risk can be managed appropriately by, for example, limiting the demographic information to which patent examiners have access. With proper management, the benefits of collecting this information should outweigh the potential risks".<sup>54</sup>

### 3.2 CHALLENGE: WOMEN ARE LESS LIKELY TO BE ENCOURAGED AND TRAINED TO ENTER STEM FIELDS. THEY ARE ALSO LESS LIKELY TO RECEIVE THE RESOURCES THEY NEED TO SUCCEED IN BUSINESS.

The IP gender gap is both a cause and a symptom of a larger issue – the challenges that women often face in pursuing studies and careers in innovative and creative fields, starting businesses and succeeding in those endeavors. As a matter of logic, women are more likely to participate in the IP system if they have training and are in careers where IP is most relevant as a tool, particularly fields in STEM. A fundamental challenge then, is that in many countries, women are disproportionately less likely to receive STEM education, less likely to enter careers in STEM fields and less likely to secure resources to start and grow their own businesses.

The challenge starts early as, in many countries, girls and women encounter a lack of access to quality education and socioeconomic barriers preventing their entry to STEM fields. In some countries, women are expected to be home-based laborers and caregivers, and technical training is thus less likely to be encouraged or provided.<sup>55</sup>

Even once they are engaged in STEM fields, studies indicate that women do not participate equally in research and development (R&D) projects. The Institute for Statistics (UIS) of the United Nations Educational, Scientific and Cultural Organization (UNESCO) surveyed several countries on R&D spending, and it currently ranks the Republic of Korea first, with R&D

---

<sup>51</sup> Bray, K. "Georgia pro-bono patent system helps women inventors." K. Marathe: interviewer. Mar. 27, 2019.

<sup>52</sup> Bartow, *op cit.*, 2016.

<sup>53</sup> Jensen, K., Kovacs, B. and Sorenson, O. "Gender differences in obtaining and maintain patent rights." *Nature Biotechnology* 36.4 (2018): pp. 307-309.

<sup>54</sup> American Bar Association IP Section. "Letter in Response to USPTO's Request for Comments and Notice of Public Hearings on the Report Required by the Study of Underrepresented Classes Chasing Engineering and Science ("SUCCESS") Act of 2018 – Initial Assignee Data." *uspto.gov*. Jun. 28, 2019. Web. <[https://www.uspto.gov/sites/default/files/documents/SUCCESSAct-ABA-IPL\\_0.pdf](https://www.uspto.gov/sites/default/files/documents/SUCCESSAct-ABA-IPL_0.pdf)>.

<sup>55</sup> International Trade Centre. "SheTrades: Promoting SME Competitiveness in Indonesia." *intracen.org*. 2017. Web. Mar. 15, 2019. <[http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/SheTrades%20Women%20Indonesia%20final\\_Low%20res.pdf](http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/SheTrades%20Women%20Indonesia%20final_Low%20res.pdf)>; and International Finance Corporation. "Voices of Women Entrepreneurs in Tanzania." *ifc.org*. World Bank Group, 2007. Web. Mar. 19, 2019. <<https://www.ifc.org/wps/wcm/connect/5b18c6c2-f4e8-4f96-8b34-d8b0906e62e2/Voices%2Bof%2BWomen%2BEntrepreneurs%2B-%2BTanzania.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-5b18c6c2-f4e8-4f96-8b34-d8b0906e62e2-jqeBF.6>>.

accounting for 4.3 per cent of GDP.<sup>56</sup> Yet, women constitute only 19 per cent of all researchers from the Republic of Korea. Although no recent, gender-specific data was provided for the second highest ranking country, Israel, women account for only 15 per cent of researchers in the third ranked country, Japan, and 32 per cent of researchers in the fourth and fifth ranked countries, Finland and Switzerland, respectively.

Women also lack the same access to capital to fund businesses as men.<sup>57</sup> In some emerging countries, women may lack access even to basic business amenities such as banking.<sup>58</sup> However, research indicates that women in developed countries do not fare much better in accessing adequate capital owing to disparities and bias in grant application approvals and investments.<sup>59</sup>

Lack of access to capital can affect IP gender disparities both directly and indirectly. As is the case with disparities in participation in STEM fields, less funding for ventures means that there are fewer women able to participate in the sort of ventures most likely to use IP. A lack of capital also has a direct effect. As one study points out, applying for a patent “is a risky venture, with the potential for great gains through commercialization, but costly to go through. Financial barriers to applying for a patent are greater for women compared to men, as women tend to have fewer financial resources, in effect preventing female inventors and entrepreneurs from filing patent applications”.<sup>60</sup>

Women may also tend to limit the scope of their entrepreneurial ventures owing to how they view their own roles and the potential of their businesses. Research shows that women often see their start-ups or small businesses as providing supplementary income, but they tend to lack the confidence or desire to expand them into more substantial ventures.<sup>61</sup>

In other cases, women lack basic legal rights over property more generally, disincentivizing them from pursuing IP protection. In Chile, for example, under the default marital property regime, the law makes the husband the administrator of the couple’s joint assets.<sup>62</sup> While couples can opt out of this regime, it impairs married women in business, as they must prove the origin and ownership of their assets when doing business with others.<sup>63</sup> Further to these restrictions, married women in Chile cannot start their own businesses without special authorization or even own shares in a corporation.<sup>64</sup>

---

<sup>56</sup> United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS). “How Much Does Your Country Invest In R&D?” *uis.unesco.org*. Web. Jul. 5, 2019. <<http://uis.unesco.org/apps/visualisations/research-and-development-spending/>>.

<sup>57</sup> Bray, *op cit.*, 2019; Fechner and Shapanka, *op cit.*, 2018.

<sup>58</sup> International Trade Centre, *op cit.*, 2017.

<sup>59</sup> Szychowski, E. and Stembel, C. “Women-owned businesses face a lack of funding – and here’s how to change this.” *marketwatch.com*. Market Watch, Mar. 8, 2019. Web. <<https://www.marketwatch.com/story/women-owned-businesses-face-a-lack-of-funding-and-heres-how-to-change-this-2019-03-08>>; Kerpen, C. “How Women Entrepreneurs Are Closing The Venture Capital Gap.” *forbes.com*. Forbes, Apr. 9, 2018. Web. <<https://www.forbes.com/sites/carriekerpen/2018/04/09/how-women-entrepreneurs-are-closing-the-venture-capital-gap/#12b25acf1cf0>>; Jervis, S. “Why women entrepreneurs are far less likely to be funded.” *The Guardian*. The Guardian Group, Aug. 6, 2015. Web. <<https://www.theguardian.com/media-network/2015/aug/06/women-entrepreneurs-venture-capital-funding-tech-startups>>.

<sup>60</sup> Marcowitz-Bitton, et al., *op cit.*, 2019, p. 15.

<sup>61</sup> International Trade Centre, *op cit.*, 2017.

<sup>62</sup> White & Case. “Closing the credit gap for female entrepreneurs.” *whitecase.com*. Nov. 20, 2017. Web. Mar. 14, 2019. <<https://www.whitecase.com/publications/article/chile-closing-credit-gap-women-entrepreneurs>>.

<sup>63</sup> Chilean Commercial Code, Article 11; Chilean Civil Code, Article 150.

<sup>64</sup> Chilean Commercial Code, Article 349.

### 3.3 CHALLENGE: WOMEN ARE LESS LIKELY TO ENTER CAREERS IN IP LAW AND ADMINISTRATION.

The participation of women in careers in IP law and administration is yet another facet of the IP gender gap. Data regarding the number of female patent practitioners and data regarding female applicants are similarly limited, but the research that exists shows similar gaps. One study of patent practitioners in the United States, tracking gender through a proxy – first name – in the same way that other studies have tracked patent applicants, showed that 26.1 per cent of United States patent agents and 18 per cent of United States patent attorneys are women,<sup>65</sup> even though women now make up roughly half of law school graduates in the United States.<sup>66</sup> A United States study from later in 2014<sup>67</sup> showed similar gaps where gender could be identified, with women comprising about 21 per cent of patent agents and 17 per cent of patent attorneys in the United States.

Data indicate that some national IP offices employ far fewer women than men. In 2015, only 26.7 per cent of USPTO examiners were women.<sup>68</sup> This disparity is not universally replicated and the statistics are encouraging in some countries; for instance, in the Islamic Republic of Iran, 60 per cent of the staff of the Iranian IP office are female IP experts, and 50 per cent of the staff of the Chinese National IP Administration are female, including examiners.<sup>69</sup>

The gender gap in IP law and administration differs from the gap among users of the system, but nevertheless represents a significant aspect of the IP gender gap for two reasons. First, unlike broader challenges such as closing the gender gap in STEM training and careers, it is something that IP offices and the IP profession can have an impact on most directly and immediately. Second, increasing the participation of women in jobs in IP law and administration may affect other aspects of the IP gender gap indirectly. For example, some who gain IP expertise in these roles may later join the founding teams of start-ups. Others may serve important roles in informal and formal networks with other women, as described in section 3.5, encouraging and helping them to use the IP system.

### 3.4 CHALLENGE: THERE IS A GENERAL LACK OF UNDERSTANDING OF THE VALUE OF IP RIGHTS AND HOW THE IP SYSTEM WORKS.

Non-specialists often find IP to be an obscure and challenging topic. A recent literature review of prior research about IP knowledge among the general public summed up the state of IP understanding as follows: “for the most part, there was significant basic awareness of both IP and the importance of respecting it. However, the research also revealed that there is a low understanding of why IP is important, a deficit that appears to encourage counterfeit purchases and content abuse, discourage small businesses from growing and leads students to misapprehend their ability to protect their work”.<sup>70</sup>

---

<sup>65</sup> Kahler, *op cit.*, 2011.

<sup>66</sup> Ciccattelli, A.G. “Are Women Under-Represented in IP Litigation?” *ipwatchdog.com*. IP Watchdog, Feb. 7, 2018. Web. <<https://www.ipwatchdog.com/2018/02/07/women-under-represented-ip-litigation/id=93243/>>.

<sup>67</sup> Vishnubhakat, S. “Gender Diversity in the Patent Bar.” *John Marshall Review of Intellectual Property Law* 14 (2014): pp. 67-90. Print.

<sup>68</sup> Statement of the United States delegation on “Women and Innovation” to the World Trade Organization Council for Trade-related Aspects of Intellectual Property Rights. Document IP/C/M/78/Add.1, Feb. 2015.

<sup>69</sup> Transcript of a meeting of the WIPO Committee on Development and Intellectual Property (CDIP), November 2018.

<sup>70</sup> Brachmann, S. “IP Awareness and Attitudes: A Summary of Research and Data.” *understandingip.org*. The Center for IP Understanding, Apr. 2019. Web. <<http://www.understandingip.org/wp-content/uploads/2019/03/IP-Awareness-and-Attitudes.pdf>>.

A lack of understanding of the value of protecting IPRs can be a barrier to participation in the IP system for people of all genders and from all demographic groups and countries. For example, a recent study by the National Union of Students in the United Kingdom suggests that IP is poorly understood even by university-level students in a developed country. Sixty-two per cent of respondents did not consider IP to be relevant to their ability to exploit their ideas commercially.<sup>71</sup> In another study, 42 per cent of entrepreneurs polled by the Kenya Copyright Board said they did not understand IP, with an additional 38 per cent saying they thought it was too expensive and risky an investment.<sup>72</sup> In yet another study of small enterprises, zero per cent of female business owners in Uganda had taken any action to protect their IP even though 40 per cent of male Ugandan business owners had.<sup>73</sup> The study reports that when conducting research interviews, the concept of IP frequently had to be explained to the women participating.<sup>74</sup>

Existing research rarely examines whether the understanding of IP differs by gender, but such a distinction is largely beside the point. Rather, the challenge lies in the fact that for most people, IP is a technical subject outside of their everyday experience.

Even entrepreneurs who are generally aware of the value of IP can find the system to be discouragingly complex and expensive. One 2012 study that asked focus groups of women entrepreneurs in the United States about their experiences with IP reflected this perspective.<sup>75</sup> The researchers found that while the groups generally understood the relevance of IP and some of them had used the system to their advantage, others had encountered obstacles. The challenges they cited often related to the nature of the system, rather than to problems uniquely faced by women.

Comments included:

- “To me, the reason I did not apply for a patent or trademark is that I don’t understand how the process works. I don’t know how to go about it”.
- “The process is so obscure”.
- “[I had] fear of the process, not knowing and understanding it. I delayed eight years from the time I knew I needed to do it (file for a trademark)”.
- “Not understanding the process because it is not laid out”.
- “I looked into patents but after looking into it, it was so convoluted with nothing for me”.
- “The reason why it never worked for me is the complexity of the process”.

These challenges in using the IP system should not surprise any IP professional, given some reflection. The practice of IP law and management is its own profession for a reason: it requires specialized training and experience, which is in demand from clients who have neither. Laypeople without such training can thus find the process of engaging the IP office, completing the necessary paperwork and prosecuting trademarks and patents difficult, time-consuming, expensive and confusing.

---

<sup>71</sup> National Union of Students and United Kingdom Intellectual Property Office. “Student attitudes towards intellectual property.” *nus.org.uk*. 2012. Web. <<http://www.nus.org.uk/PageFiles/12238/IP%20report.pdf>>.

<sup>72</sup> Waruru, M. “Kenya In Drive To Get Artisans, Designers To Embrace IP.” *ip-watch.org*. IP Watch, Sep 13, 2016. Web. <<https://www.ip-watch.org/2016/09/13/kenya-in-drive-to-get-artisans-designers-to-embrace-ip/>>.

<sup>73</sup> United Nations Conference on Trade and Development. “A Survey on Women’s Entrepreneurship and Innovation.” *unctad.org*. 2013. Web. Mar. 24, 2019. <[http://empretec.unctad.org/wp-content/uploads/2015/01/UNCTAD\\_DIAE\\_ED\\_2013\\_1.pdf](http://empretec.unctad.org/wp-content/uploads/2015/01/UNCTAD_DIAE_ED_2013_1.pdf)>.

<sup>74</sup> *Ibid.*

<sup>75</sup> National Women’s Business Council. “Intellectual Property and Women Entrepreneurs.” Sep. 10, 2012. Web. Mar. 22, 2019. <<https://s3.amazonaws.com/nwbc-prod.sba.fun/wp-content/uploads/2018/02/27192554/Qualitative-Analysis-Intellectual-Property-Women-Entrepreneurs-Part-2.pdf>>.

While this lack of understanding of either the value of IP or how to use the IP system is not unique to women, it is nevertheless a challenge to increasing the participation of women in the IP system. First, the technical nature of the subject matter can make efforts to encourage women to use the IP system more challenging. For example, simply raising awareness may not be enough. People can be aware of IP and its value generally, as the research shows, without seeing its value to their own work or understanding how to access and more effectively engage with the system.

Furthermore, as the other challenges discussed in this report indicate, fewer women are afforded the opportunity to occupy positions that tend to provide greater knowledge of how to navigate the IP system. They are less likely to receive STEM training, have their start-ups funded or enter careers as IP professionals, and so they are less likely to be in positions that afford them the chance to naturally and inevitably increase their understanding of the value and workings of the IP system.

### 3.5 CHALLENGE: WOMEN ARE LESS LIKELY TO RECEIVE MENTORING AND OPPORTUNITIES FOR ADVANCEMENT IN IP-INTENSIVE FIELDS.

The IP gender gap is not only a product of lower rates of participation by women in IP-intensive fields, or a lack of awareness of or use of the IP system. In some sense, these are threshold indicators of the problem. A further dimension of the IP gender gap is that women face further barriers once they are working in IP-intensive fields or attempting to take advantage of the IP system.

#### *Finding effective mentorship and networks to aid career success*

Women often lack peers as role models and networks within IP-intensive fields.

- Only 30 per cent of the world's researchers are women.<sup>76</sup>
- Most CEOs, chancellors, department heads, technology transfer professionals, IP lawyers, IP advisors, patent agents and venture capitalists are men.<sup>77</sup>
- Women are less represented on the boards and scientific advisory committees of successful IP-based start-ups.<sup>78</sup>

As a result of these disparities, there are fewer strong, powerful, female role models in these fields for girls and young women to look up to, which may discourage entry into these fields (and perpetuate these disparities).<sup>79</sup> These disparities also make it less likely that women will be mentored by influential leaders in their fields, and their professional networks tend to be less powerful.<sup>80</sup>

Networking is not just a matter of providing inspiration. There are indications that women receive less effective guidance in managing their IP-related activities and less sponsorship for more

---

<sup>76</sup> UNESCO UIS, *op cit.*; Fechner and Shapanka, *op cit.*, 2018; Milli J., Williams-Baron, E., Berlan, M., Xia, J. and Gault, B. "Equity in Innovation: Women Inventors and Patents." *iwpr.org*. Institute for Women's Policy Research, 2016. Web. Mar. 20, 2019. <<https://iwpr.org/wp-content/uploads/wpallimport/files/iwpr-export/publications/C448%20Equity%20in%20Innovation.pdf>>.

<sup>77</sup> Vishnubhakat, *op cit.*, 2014.

<sup>78</sup> Hanes, S., Ku, K., Primiano, L. and Arvin, A. "Gender Analysis of Invention Disclosures and Companies Founded by Stanford University Faculty from 2000-2014." *Les Nouvelles – Journal of the Licensing Executives Society* 22.1 (2018): pp. 83-90. Web. Apr. 5, 2019. <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3103214](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3103214)>.

<sup>79</sup> White & Case, *op cit.*, 2017.

<sup>80</sup> Milli, et al., *op cit.*, 2016; Burk, *op cit.*, 2018.



advanced opportunities. Research shows the following disadvantages that can likely be attributed to a lack of effective mentoring and networks:

- Women are not often invited to take on leadership positions.<sup>81</sup>
- Women have been seen to be less successful in pursuing grant-funded research. Studies show that women tend to focus on details and use more narrow or specific terms in their grant proposals, while men tend to focus on the big picture and use broader language, leading to greater success.<sup>82</sup>
- Women tend to receive smaller grants than their male counterparts.<sup>83</sup>
- With respect to copyrighted work, research shows that authors tend to prefer co-authors of the same gender.<sup>84</sup>

### *Staying in IP-intensive fields*

Women may find it challenging to stay and succeed in demanding STEM careers owing to gender roles and expectations. Women all over the world tend to do more unpaid, home-based labor and child-rearing than men.<sup>85</sup> Those who do work outside the home, especially in STEM fields, often leave after having their first child<sup>86</sup> owing to issues relating to childcare, a lack of family leave or inflexible work hours or arrangements. According to a recent United States study, 43 per cent of women and 23 per cent of men left full-time STEM careers after becoming parents.<sup>87</sup> In academia, women in high-ranking positions are less likely to be married or have children than their male counterparts.<sup>88</sup> Women in both academic and commercial settings report lacking the time, possibly owing to issues relating to their work-life balance, to engage in entrepreneurial activities, including the commercialization of academic research.<sup>89</sup> During a WIPO meeting in 2018, the delegation of Switzerland noted this challenge, observing that the gender gap in IP may be attributed not to features of the IP system per se but rather to general social and cultural hurdles that prevent women from realizing their full potential, including but not only in relation to the exploitation of IP rights.

### *Successfully commercializing inventions*

Women are often less likely to engage in the commercialization of their inventions. Research shows that women are less likely to envision the commercialization of their inventions or to take steps to lead and participate in such activities.<sup>90</sup> Specifically, studies indicate that women in academia do not utilize technology transfer offices (TTO) as often as men.<sup>91</sup> Studies also indicate

---

<sup>81</sup> Fechner and Shapanka, *op cit.*, 2018.

<sup>82</sup> Szychowski and Stembel, *op cit.*, 2019; Fechner and Shapanka, *op cit.*, 2018.

<sup>83</sup> Flaherty, C. "Smaller Pots for Women." *insidehighered.com*. Inside Higher Ed, Mar. 6, 2019. Web. <<https://www.insidehighered.com/news/2019/03/06/new-study-nih-funding-says-women-get-smaller-grants-men>>.

<sup>84</sup> Brauneis and Olliar, *op cit.*, 2018.

<sup>85</sup> International Trade Centre, *op cit.*, 2017; International Finance Corporation, *op cit.*, 2007.

<sup>86</sup> Else, H. "Nearly half of U.S. female scientists leave full-time science after first child." *nature.com*. Nature International Journal of Science, Feb. 19, 2019. Web. <<https://www.nature.com/articles/d41586-019-00611-1>>.

<sup>87</sup> *Ibid.*

<sup>88</sup> Johnson, H.L. "Pipelines, Pathways, and Institutional Leadership: An Update on the Status of Women in Higher Education (Higher Ed Spotlight)." *acenet.edu*. American Council on Education, Center for Policy Research and Strategy, 2017. Web. <<https://www.acenet.edu/news-room/Documents/Higher-Ed-Spotlight-Pipelines-Pathways-and-Institutional-Leadership-Status-of-Women.pdf>>.

<sup>89</sup> International Trade Centre, *op cit.*, 2017.

<sup>90</sup> Demiralp, et al., *op cit.*, 2018.

<sup>91</sup> Sohar, K., Mercier, N., Goble, L., Gahramani, F. and Loftin, B. "Gender Data Gap: Baseline of U.S. Academic Institutions." *Technology & Innovation* 19 (2018): pp. 671-683. Print.

that although “women in academia patent at higher rates compared to industry and government,” male faculty members are 43 per cent more likely to engage and utilize a TTO.<sup>92</sup> Researchers at Washington University in St. Louis, United States, discovered that variations in risk profiles, fewer industry connections, biological and domestic constraints, and an unwillingness to begin the protection process before the laboratory work is deemed “ready” were all factors in female innovators’ delay or general lack of interaction with a TTO.<sup>93</sup> However, studies also indicate that women are more likely to re-engage with a TTO after they secure their first patent.

Even after their IP has been protected, women in general have lower levels of commercialization. This may be partially owing to incentive structures and additional costs.<sup>94</sup>

### *Implicit bias*

An issue that may underpin other challenges and make them more difficult to resolve is the problem of implicit bias – unconscious biases and stereotypes held by decision-makers. Research has indicated that long-standing barriers to full participation in economic opportunities may persist because of implicit bias.<sup>95</sup>

Women have offered anecdotal support of how such implicit bias leads to the IP gender gap. For example, in one study,<sup>96</sup> women were asked why women tended to abandon or not pursue patent and trademark applications. Explanations included: “The discouragement from society, from parents or friends rather than any rejection from the USPTO is what accounts for a patent or trademark application abandonment”. Another responded that: “I don’t think my [former] husband would have supported me in what I am doing ... for a man it is different. If a man is trying something, the woman would support him. If there are more patents and trademarks for men, that might be a reason”.

A recent study found apparent evidence of implicit bias in the examination of patents in the United States. It found that applications where the inventor has a traditionally female name tend to be rejected more often than applications where the inventor has a recognizably male name.<sup>97</sup> When women’s applications are approved, the examiner often required additional language that narrowed the scope of the patent claims and, therefore, the potential market commercialization.<sup>98</sup> The USPTO has disputed the findings of this research.

---

<sup>92</sup> *Ibid.*

<sup>93</sup> *Ibid.*

<sup>94</sup> Fechner and Shapanka, *op cit.*, 2018; Milli, et al., *op cit.*, 2016.

<sup>95</sup> The most notable aspect of this research is focused on racial discrimination in employment. See Bertrand, M. and Millainathan, S. “Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination.” *The American Economic Review* 94.4 (2004): pp. 991-1013. Print (“white names receive 50 percent more callbacks for interviews” than names associated with African-Americans); Jacquemet, N. and Yannelis, C. “Indiscriminate discrimination: A correspondence test from ethnic homophily in the Chicago Labor Market.” *Labour Economics* 19.6 (2012): pp. 824-832. Print (“[r]esumes with Anglo-Saxon names generate nearly one-third more callbacks than identical resumes with non-Anglo-Saxon ones”).

<sup>96</sup> National Women’s Business Council, *op cit.*, 2012.

<sup>97</sup> Jensen, et al., *op cit.*, 2018.

<sup>98</sup> *Ibid.*

## 4.0 SOLUTIONS AND POLICIES TO ADDRESS THE IP GENDER GAP

The existence of an IP gender gap is well established and, as the previous section describes, its underlying challenges are fairly well documented and understood. Data-collection and research about this gender gap are developing steadily.

In contrast, solutions to these challenges are not fully developed, although there are a few promising policies. Although this report originally set out to document best practices for addressing the IP gender gap, the authors discovered that few “best practices” in the usual meaning of that term yet exist. While the problem has been identified, actions to address it are still relatively new. As a result, rather than well-established and tested policies, we were largely able to identify promising policies that can serve as a model for further attempts and, perhaps, future best practices.

Considering the five challenges underlying the IP gender gap listed in section 3, we have identified five corresponding categories of policies and programs aimed at addressing each challenge, and thereby the IP gender gap. For each category, we have reviewed and identified recommendations provided by experts and advocates, and, where they exist, we describe exemplary programs and initiatives aimed at addressing the challenge.

Policymaking to enhance women’s participation in the IP system necessarily touches on some very sensitive societal and structural issues. To be effective, policies must go beyond superficial fixes and address the underlying systemic causes that prevent women from entering STEM careers, patenting at the same rate as men (all things being equal), protecting and commercializing their IP, and otherwise effectively leveraging IPRs for success in the marketplace. The experience of female innovators, creators and entrepreneurs, and their experience using IPRs will necessarily differ based on where they come from and where they are active. Nonetheless, we expect to see similarities across national, regional and global IP systems.

Based on our research, countries could consider exploring policies in several categories, building on their efforts to support female entrepreneurs, inventors and creators over time. Below we have identified key categories of policies for countries to consider, with examples of real-world policies under each category. Where possible, we assess how well the policies have worked using the available evidence. It can be expected that countries will be at different stages in the process of supporting women to engage with the IP system. We expect that all will need to consider data collection as a first step.

### 4.1 COLLECTING MORE DATA TO UNDERSTAND THE SCOPE AND NATURE OF THE IP GENDER GAP

Collecting precise data about women’s use of IP protection is an important starting point not only to develop appropriate policy solutions, but also to be able to compare data across countries to pinpoint whether barriers stem from structural or cultural conditions.<sup>99</sup> Yet, as described in section 3.1, there remains relatively little data on women’s use of the IP system.

Most initiatives to remedy this issue are in the early stages and therefore it is not possible to say definitively that there are best practices for data collection and analysis. More time is needed to evaluate practices over time and to refine them. Nevertheless, policies need to start somewhere.

---

<sup>99</sup> Brauneis and Oliar, *op cit.*, 2018.

The earliest step is to determine what data is being collected and what challenges stand in the way.

Recently, the Association of University Technology Managers did a survey to determine whether and, if so, what data on IP usage and gender was being collected by its members.<sup>100</sup> The case study at the end of this section describes the results in detail, but one important result of the survey was a better understanding of the barriers to data collection.

Recent legislation in the United States is aimed at encouraging the collection of more data regarding women’s use of the patent system. A bill passed in October 2018 in the United States Congress, H.R. 6758, dubbed the SUCCESS Act, directs the USPTO to study how many patents are applied for and obtained by women, minorities and veterans, and then to suggest policies to increase those numbers.<sup>101</sup> This legislation is too recent to show results at this point in time, but it does suggest that countries are beginning to explore approaches to addressing gaps in data collection.

To complement the WIPO Secretariat’s efforts to quantify and study the IP gender gap, the Canadian IP Office conducted and published an in-depth study entitled “Women’s Participation in International Patenting and Analysis of International Patents Applications Originating in Canada”. Among other things, the research found that more women were graduating in STEM fields, and that relatively lower rates of patenting among women were therefore caused by other factors. The findings pointed to the need for further research about the IP gender gap.

Collecting accurate data on women’s rates of protecting their IP is the first step to understanding what types of policy initiatives will generate the most meaningful impact in this space. While collecting improved data would not benefit women in the short term, it would inform better policies to support women’s needs in academic and corporate settings. Better data collection has been repeatedly identified as a critical gap in studies and policy papers across the globe.

#### Case study: Collecting information about gender data collection practices

The Women’s Inventor Committee of the Association of University Technology Managers (AUTM) determined that more information was needed regarding women’s use of university TTOs. TTOs are key players in the IP ecosystem, as they help university researchers to secure IP rights in their inventions and commercialize them.

In 2015, AUTM decided to conduct research on female participation in the IP system within universities by requesting that their members – over 300 universities, research institutions and teaching hospitals around the world – include a question on gender on member surveys in order to understand how TTOs are including gender issues in their reporting, raise awareness of the relevance of tracking gender and increase the rate of gender tracking by university TTOs.

---

<sup>100</sup> Sexton, K.B. and Ligler, F.S. “Strategies to Close the Gender Gap in Invention and Technology Commercialization.” *Technology & Innovation* 19.4 (2018): pp. 701-706, 701. Print.

<sup>101</sup> SUCCESS Act. “Public Law No: 115-273.” *congress.gov*. United States Congress, Oct. 31, 2018. Web. <<https://www.congress.gov/bill/115th-congress/house-bill/6758>>.

This case study shows that the efforts to gather data about the IP gender gap are at early stages. In order to start to understand how women engaged with TTOs, AUTM first had to understand whether and what information its members were gathering.

The Committee distributed short five-question voluntary surveys to 189 university TTOs in the United States. The survey asked whether the TTO captured gender-related data from users, why or why not, and, if not, if they would be open to doing so.

Of the 189 TTOs approached, 43 per cent responded either directly to the emailed survey or via a follow-up phone call. Of the respondents, only 7 per cent were capturing gender data and most of the reasons for not doing so pertained to historical patterns or a lack of understanding of the need for this information. Another reason, albeit a less common one, was concern about how poor statistics of female participation would reflect on the university externally. Another finding from the study was that of the four leading commercial software programs used by TTOs to manage their workflow, only two included a gender-tracking feature.

Upon follow-up, nearly half of the respondents indicated an interest in beginning to track this data. Additionally, the two software companies used by TTOs that had not offered a gender-tracking measure began offering one following the conclusion of the survey.

The survey carried out by the AUTM Women's Inventor Committee offers valuable insights into the reasons data is not being captured about women's participation in IP protection in the first place. While the initial survey was easy to carry out, participation was not widespread. Although time-consuming, following up via phone was helpful and added useful context to responses, while also enabling the Committee to explain to TTOs the benefits of tracking gender.

This case study demonstrates that key players in the IP ecosystem, especially associations and other intermediaries, can gain valuable insights into the IP gender gap at a relatively low cost by first evaluating their collection of data on use of the IP system by gender and then including relevant questions in information-gathering activities. Other organizations in both the public and private sector can also make such efforts, including in some instances where information is already being gathered, and the cost is no more than the awareness and effort it takes to include gender-related questions in surveys and other information-gathering instruments.

Source:

Sohar, K., Mercier, N., Goble, L., Gahramani, F. and Loftin, B. "Gender Data Gap: Baseline of U.S. Academic Institutions." *Technology & Innovation*, 19.4 (2018): pp. 671-683. Print.

#### 4.2 ENCOURAGING AND TRAINING MORE WOMEN TO ENTER STEM FIELDS AND PROVIDING THE RESOURCES THEY NEED TO SUCCEED IN BUSINESS

As discussed in section 3.2, the IP gender gap is both a product of and contributor to fewer women succeeding in innovative and creative fields. There is a mutually reinforcing dynamic between helping women to succeed in IP and helping women to succeed in STEM and other IP-intensive fields. For example, while a successful inventor who patents her invention is more likely to succeed in business, a woman who succeeds in business is more likely to invent and patent.

Countries such as Switzerland have witnessed growing numbers of women inventors. According to the Swiss Government, the share of Swiss women inventors rose from 16 per cent in 2000 to 28 per cent in 2017. This near-doubling of the share of female inventors may reflect the impact of programs created during this 20-year period that aimed to create equal opportunities for women in education. Statistics indicate considerable growth and improvement in the number of Swiss women choosing technological and mechanical fields.<sup>102</sup> While many valuable programs do not target women's IP use per se, programs that help women to enter and stay in STEM-related fields can nonetheless advance their use of the IP system.

We will focus here on the eight types of interventions most likely to contribute either to women entering STEM or other IP-intensive fields or to being able to start entrepreneurial ventures. Of all the policy interventions described in this paper, the ones listed in this section appear to be the most developed and successful at this point in time, and thus the most advanced on the path to yielding what could be described as best practices. The case study that concludes this section describes one particularly successful program targeting girls, which might serve as a model for helping women more generally.

### *Programs for girls*

Such programs initially focus on encouraging girls to enter IP-intensive fields. Establishing age-appropriate, inclusive and accessible primary and secondary school programs that encourage interest in IP-related industries and provide hands-on exposure to them can inspire the next generation of women entrepreneurs and innovators. There are several successful examples of such girl-focused programs around the world.

- Since 2015, the public-private initiative Women in Science Girls' STEAM (Science, Technology, Engineering, Art and Mathematics) Camps have trained more than 500 high school girls from over 20 different countries. Some 78 per cent of the program's alumni went on to seek tertiary degrees in STEM subjects.<sup>103</sup>
- In Australia, a Women-in-STEM Ambassador has been nominated by the Government to raise awareness about gender equality in STEM careers. This complements a range of programs including the Government's Women in STEM Strategy to coordinate public sector efforts to increase women's participation in science and technology, and the Women in STEM and Entrepreneurship Program which provides funding to businesses, non-governmental organizations (NGOs) and research organizations so that they can carry out outreach programs aimed at involving more women in STEM careers.<sup>104</sup>
- Techbridge Girls, a United States-based organization that is profiled at length in the case study at the end of this section, collaborates with multinational companies such as Chevron and organizations such as the Boys and Girls Clubs of America to offer STEM programs and opportunities to primary and secondary school girls in underprivileged areas.
- In Tanzania, the Let Girls Learn initiative works to increase girls' access to quality secondary education and to improve "community perceptions about the value of educating girls".<sup>105</sup>

---

<sup>102</sup> Transcript of WIPO CDIP meeting, *op cit.*, November 2018.

<sup>103</sup> GirlUp. "WiSci Girls STEAM Camp." *girlup.org*. Web. Jul. 5, 2019. <<https://www.girlup.org/wisci/#sthash.mqfQPOul.dpbs>>.

<sup>104</sup> Transcript of WIPO CDIP meeting, *op cit.*, November 2018.

<sup>105</sup> United States Agency for International Development. "Gender Equality and Women's Empowerment." *usaid.gov*. 2019. Web. Aug. 15, 2019. <<https://www.usaid.gov/tanzania/our-work/gender-equality-and-women%E2%80%99s-empowerment>>; Laboratoria. "English Homepage." *laboratoria.la*. Web. Jul. 31, 2019. <<https://www.laboratoria.la/en>>.

### *Programs for women*

Other interventions target women. For women in lower-income areas or developing countries who lack access to quality education, a series of training workshops can be provided to educate them and encourage them to enter innovative fields. Laboratoria, an organization founded by a female entrepreneur, provides “boot camps” for women across Latin America to learn the skills necessary for tech careers. Over three years, more than 1,000 women graduated from Laboratoria, and 80 per cent of the 2017 class went on to work in the industry. In Mexico, a program called Victoria 147 provides a platform for training, incubation, acceleration and networking that focuses on the development and empowerment of female entrepreneurs and executives in Mexico. With offices in Mexico City, Merida and Monterrey, Victoria 147 is the largest and most experienced organization in Mexico offering training and networking opportunities for businesswomen. In Japan, the Government launched the “Creating a Society in Which All Women Shine” program, which included specific projects aimed at supporting female entrepreneurs and female researchers, including in efforts to balance work and family life. According to the Government of Japan, the turnover rate of female scientists decreased, and there was also an increase in the number of female researchers, in part as a result of this initiative.<sup>106</sup>

### *Programs for educators*

Training educators to provide an innovation-based curriculum that is both gender-sensitive and culturally relevant is also necessary to encourage girls to enter IP-related careers. Offering professional development training, workshops and resources available in print, online and via mobile apps, will better equip educators to prepare future women entrepreneurs adequately. Since girls are more likely to seek advice from their families than boys, engaging families to encourage and cultivate the education of female innovators can play a significant role in whether those young women enter and stay in IP-related careers.<sup>107</sup> Engaging family members might include offering resources or workshops and providing hands-on events featuring family-based teamwork projects, exploration activities, discussions with female role models or screenings of movies, television shows or documentaries featuring successful women entrepreneurs. Since 2000, Techbridge Girls has trained “20,000 educators, 1,400 family members, 1,500 role models and 1,000 volunteers” “to support girls’ paths toward STEM professions”. In Australia, the Government’s Girls in STEM Toolkit helps school-age girls to understand what a STEM career could involve and assist them in pursuing a STEM career.<sup>108</sup>

### *Grants and scholarships for STEM education*

A lack of funding is a significant reason for the disparity in the use of IP by women entrepreneurs, as well as in their entrance into IP-intensive fields. Both the public and private sectors can utilize scholarships, fellowships and grants to encourage girls and women to enter and stay in IP-related careers. For example, the WAAW Foundation, the Anita Borg Systems Pass It On Awards Program, the Asian Women in Business Scholarship Fund, the Association for Women in Mathematics, the Society of Women Engineers and Possible Woman Foundation International all

---

<sup>106</sup> Transcript of WIPO CDIP meeting, *op cit.*, November 2018.

<sup>107</sup> Sammet, K. and Kekelis, L. “Changing the Game for Girls in STEM: Findings on High Impact Programs and System-Building Strategies.” *techbridgegirls.org*. Techbridge Girls. Apr. 2016. Web. <<https://techbridgegirls.org/Changing%20the%20Game%20for%20Girls%20in%20STEM%20White%20Paper%20FINAL%204.8.16.pdf>>; Techbridge Girls. “Homepage.” Web. <<https://www.techbridgegirls.org/>>.

<sup>108</sup> Transcript of WIPO CDIP meeting, *op cit.*, November 2018.

offer scholarships specifically for women studying a STEM-based field. However, some of these awards are also subject to a lack of funds and cannot provide help on an annual basis.<sup>109</sup> Greater support for such endeavors can help women to succeed in business and innovation.

In academia, fellowships could be offered specifically for women studying STEM-based fields. The international NGO Graduate Women works to ensure women's access to quality secondary and tertiary education,<sup>110</sup> including by offering fellowships and grants.

Grant applications could also require a certain percentage of listed innovators on the team to be women, offer awards specifically for women-led research and innovation, or make the involvement of women a significant factor or requirement in selection for awards. Criteria for the selection of such financial assistance should also be reviewed for bias or disadvantages against female applicants. A recent study on grants awarded by the Bill & Melinda Gates Foundation over the course of a decade indicated that women tend to use more "narrow" or specific terms in their grant proposals.<sup>111</sup> Selection committees tended to gravitate toward the proposals with seemingly broader potential, generally drafted by men, even though these frequently underperformed compared to their more narrowly drafted counterparts.<sup>112</sup>

### *Internships and mentoring*

Career exploration, internships and research opportunities are also ways both the public and private sectors can help women entrepreneurs to succeed. Yet, women are less likely to receive such opportunities, especially in STEM-related fields. Behind-the-scenes glimpses often spark intrigue and provide insights. Programs such as Techbridge Girls have proven that by meeting and speaking with successful women entrepreneurs and innovators through career exploration events, girls are more likely to consider entering IP-related fields. Internships also provide hands-on experience to encourage female participation in such fields and to better equip women entrepreneurs for future success. These opportunities often coincide with mentorships or networking, as explained further below.

### *Funding opportunities for academic researchers*

A lack of funding is often a significant reason why women do not spend money on patenting or maintaining IP rights. A recent study focused on the academic sector found that, on average, female, first-time principal investigators received about 40,000 United States dollars less in grants than their male counterparts.<sup>113</sup> Academic institutions and all organizations offering grants should review their policies for bias that could result in women innovators being disadvantaged.<sup>114</sup>

---

<sup>109</sup> WAAW Foundation. "Scholarships." *waawfoundation.org*. Web. Aug. 1, 2019. <<http://waawfoundation.org/scholarships/>>; Anita Borg Institute. "Pass It On Awards Program." *anitab.org*. Web. Aug. 1, 2019. <<https://anitab.org/awards-grants/pass-it-on-awards-program/>>; Asian Women In Business. "Asian Women In Business Scholarship Fund." *awib.org*. Web. Aug. 1, 2019. <<http://www.awib.org/index.cfm?fuseaction=page.viewPage&pageID=811&nodeID=1>>; The Association for Women in Mathematics. "About the AWM." *awm-math.org*. Web. Aug. 1, 2019. <<https://awm-math.org/about/>>; Society of Women Engineers. "Homepage." Web. <<https://swe.org/>>; Possible Woman Foundation International. "Homepage." Web. <<http://possiblewomanfoundationinternational.org/>>.

<sup>110</sup> Graduate Women International. "Homepage." Web. <<https://graduatewomen.org/>>.

<sup>111</sup> Jagannathan, M. "Women choose more precise words than men when applying for grant funding, but guess who's more successful?" *marketwatch.com*. Market Watch, May 8, 2019. Web. <<https://www.marketwatch.com/story/how-word-choices-in-grant-proposals-makes-women-less-likely-to-get-funding-2019-05-06>>.

<sup>112</sup> *Ibid.*

<sup>113</sup> Flaherty, *op cit.*, 2019.

<sup>114</sup> Cutura, *op cit.*, 2019; Jagannathan, *op cit.*, 2019.



Creating a two-step, blind selection process where the selection committee does not have access to the names and gender-related information of applicants might better ensure that female innovators receive adequate funding, in particular in cases involving historical bias.

### *Promoting investment capital for women entrepreneurs*

Women also often lack information and access to adequate venture capital and other finance opportunities, preventing the commercialization of many innovative products.<sup>115</sup> Much like organizations offering grants, those capable of investing or providing financial assistance to women entrepreneurs should address and eliminate any potential bias in their funding decisions and encourage investment in women.<sup>116</sup> Organizations such as the Global Fund for Women, the Women's Funding Network, #GirlBoss and the Women's Funding Alliance are working to provide women entrepreneurs with greater access to funding.<sup>117</sup> Generally, these groups connect philanthropists – often successful women entrepreneurs themselves – with women entrepreneurs facing racial discrimination or working in developing countries. Other organizations, such as CloQ and the World Bank, are working to provide women with greater opportunities for and access to loans.<sup>118</sup>

Governments can also utilize tax incentives and breaks to encourage the inclusion of women entrepreneurs. Incentives or tax breaks for organizations or research teams predominantly comprised of women, including those with a determined percentage of women or focused on helping women entrepreneurs, can help to narrow the gender gap in financing.<sup>119</sup>

### *Fundamental capacity-building*

Everything that disadvantages women matters in some sense, and one could therefore say that any policy that improves the capabilities of women may contribute to remedying the IP gender gap. This paper's assessment of policies is largely restricted to those directly relevant to IP and the activities and sectors that most directly affect the IP gender gap, both for reasons of practicability and relevance to its likely audience.

Nevertheless, there are some strong connections between policies that affect women's fundamental capacities and the IP gender gap, particularly with respect to women's property rights

---

<sup>115</sup> Szychowski and Stembel, *op cit.*, 2019; Kerpen, *op cit.*, 2018; Jervis, *op cit.*, 2015; European Commission. "Female entrepreneurs." *ec.europa.eu*. Web. Aug. 2, 2019. <[https://ec.europa.eu/growth/smes/promoting-entrepreneurship/we-work-for/women\\_en](https://ec.europa.eu/growth/smes/promoting-entrepreneurship/we-work-for/women_en)>.

<sup>116</sup> Stillman, J. "5 Tips for Fundraising While Female." *inc.com*. Inc., Sep. 29, 2015. Web. <<https://www.inc.com/jessica-stillman/5-tips-for-fundraising-while-female.html>>.

<sup>117</sup> Global Fund for Women. "Women's Funds." *globalfundforwomen.org*. 2019. Web. <<https://www.globalfundforwomen.org/our-approach/womens-funds/#.XD4Y01xKg2w>>; Women's Funding Network. "Homepage." Web. Jul. 31, 2019. <<https://www.womensfundingnetwork.org/>>; Gaillot, A. "The Venture Capital World Has A Problem With Women of Color." *girlboss.com*. GirlBoss, Jan. 21, 2019. Web. <<https://www.girlboss.com/identity/venture-capital-woc-women-of-color>>; Women's Funding Alliance. "Grants." *wfalliance.org*. Web. <<https://wfalliance.org/about/grants/>>.

<sup>118</sup> CloQ. "Homepage." Web. <<https://cloq.app/>>; World Bank. "Expanding Women's Access to Financial Services" *worldbank.org*. Feb. 26, 2014. Web. <<https://www.worldbank.org/en/results/2013/04/01/banking-on-women-extending-womens-access-to-financial-services>>.

<sup>119</sup> Upcounsel. "Woman Owned Business Tax Benefits: Everything You Need to Know." *upcounsel.com*. 2019. Web. <<https://www.upcounsel.com/woman-owned-business-tax-benefits>>; Moyseyenko, I. "Tax & Business Tips for Women-Owned Businesses." *taxwarriors.com*. Drucker and Scaccetti, Jul. 26, 2017. Web. <<https://www.taxwarriors.com/blog/tax-business-tips-for-women-owned-businesses>>; European Commission. "European Network to Promote Women's Entrepreneurship (WES) Activity Report." *ec.europa.eu*. 2012. Web. <[https://ec.europa.eu/docsroom/documents/5379/attachments/1/translations/en/renditions/pdf&ved=2ahUKEWjj\\_fzXoJXkAhUQWq0KHQ2GDEEQFjAAegQIBhAB&usq=AOvVaw1w0JSC6znzbfqP5riS3pcQ](https://ec.europa.eu/docsroom/documents/5379/attachments/1/translations/en/renditions/pdf&ved=2ahUKEWjj_fzXoJXkAhUQWq0KHQ2GDEEQFjAAegQIBhAB&usq=AOvVaw1w0JSC6znzbfqP5riS3pcQ)>; OECD/European Union. "Policy Brief on Women's Entrepreneurship." *oecd.org*. 2017. Web. <<https://www.oecd.org/cfe/smes/Policy-Brief-on-Women-s-Entrepreneurship.pdf>>.

and property ownership generally. Research on the relationship between property ownership and IP protection indicates that when women's legal property ownership rights reach parity with men's, their rates of patenting increase.<sup>120</sup> However, nearly 40 per cent of countries worldwide place legal limitations on women's rights to property ownership<sup>121</sup>, and over 80 per cent of land globally is owned by men.<sup>122</sup>

As the economist Hernando de Soto famously highlighted in his groundbreaking work, *The Mystery of Capital*, clear title to property is important to escaping poverty. Among other things, the secure ownership of property makes financing for building and expanding entrepreneurial ventures more viable. The extent to which women are disadvantaged with respect to property ownership is linked to their likelihood of building the type of businesses that would induce them to seek IPRs.

Owned property can be used as collateral for loans and offers a safety net that can encourage risk-taking. Research has shown that when women have equal inheritance rights, firm creation by women significantly increases.<sup>123</sup> For example, in 2003, the Government of Ethiopia carried out a large-scale joint titling of smallholder farms that added women's ownership rights to each property ownership certificate. As a result, women are now producing two to three times as much on their farms and investing in infrastructure on their properties, and have increased their participation in the rental market.<sup>124</sup> They have experienced improved welfare overall, particularly in households where they are the heads.<sup>125</sup>

#### Case study: Encouraging young women to enter STEM fields

Since 2000, the United States-based organization Techbridge Girls has introduced girls to STEM fields. Its leaders acknowledge that women, especially minorities and those in marginalized communities, are less likely to be encouraged and trained to enter STEM fields, so they set out to inspire and educate the next generation of women innovators. Techbridge Girls currently provides specific programming in Oakland and San Jose, California, the Greater Seattle region in Washington state and Washington, D.C., but its efforts have a much wider impact.

The organization is well on the way to accomplishing its goal of reaching one-million girls by 2030. Since its inception, Techbridge Girls has engaged more than 70,000 young people, 20,000 educators, 1,400 family members, 1,500 role models and 1,000 volunteers. It partners with corporations such as Chevron, Boeing, Bayer and Cisco, as well as non-profits and organizations such as Boys and Girls Clubs of America, Girl Scouts, the Expanding Your

<sup>120</sup> Khan, B.Z. "Married women's property laws and female commercial activity: Evidence from United States patent records, 1790–1895." *The Journal of Economic History* 56.2 (1996): pp. 356-388. Web. <<http://www.jstor.org/stable/2123970>>.

<sup>121</sup> World Bank. "Women, Business, and the Law Factsheet 2018." *worldbank.org*. World Bank Group, 2018. Web. <<http://pubdocs.worldbank.org/en/794041522241147529/WBL-fact-sheet-using-property-FINAL-PDF.pdf>>.

<sup>122</sup> Villa, M. "Women own less than 20 per cent of the world's land. It's time to give them equal property rights." *weforum.org*. World Economic Forum, Jan. 11, 2017. Web. <<https://www.weforum.org/agenda/2017/01/women-own-less-than-20-of-the-worlds-land-its-time-to-give-them-equal-property-rights/>>.

<sup>123</sup> Naaraayanan, S.L. "Women's Inheritance Rights and Entrepreneurship Gender Gap" (Working Paper). *editorialexpress.com*. Feb. 2019. Web. <[https://editorialexpress.com/cgi-bin/conference/download.cgi?db\\_name=CICF2019&paper\\_id=645](https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=CICF2019&paper_id=645)>.

<sup>124</sup> Barne, D. "Ethiopian Women Gain Status Through Landholding." *Gender Equality as Smart Economics*. World Bank. Oct. 1, 2010. Web. <<http://siteresources.worldbank.org/INTGENDER/Resources/October2010-4.pdf>>.

<sup>125</sup> Girma, H. and Giovarelli, R. "Brief: The Gender Implications of Joint Titling in Ethiopia." *focusonland.com*. Focus on Land in Africa, 2019. Web. <<http://www.focusonland.com/foia/en/countries/brief-the-gender-implications-of-joint-titling-in-ethiopia/>>.

Horizons Network and the Society of Women Engineers to provide career exploration, mentorship and networking opportunities, in addition to educational activities. The latter activities include workshops, camps, participation in the USA Science & Engineering Festival, screenings of historical-based movies featuring women in STEM, TechBridge Girls' pathways, after-school educational programs via schools eligible for government "Title 1" funding and non-profit organizations.

However, Techbridge Girls does not just focus directly on the students. Its leaders understand that the gender gap stems from stigmas as well as a lack of understanding. The organization therefore also offers workshops, educational materials, role model training, research publications and resources for educators and families. Informing families of the importance of STEM and training teachers on how to best reach and encourage girls in STEM are two of the most impactful ways to break down the barriers associated with male-dominated fields and combat the challenge of the lack of women in STEM-based careers.

Educational outreach initiatives such as Techbridge Girls are the best means of solving the problem of women lacking the encouragement and training to enter STEM fields. They actively seek to encourage, engage and train girls for the specific purpose of entering STEM fields. The more girls enter these fields, the more likely it is that the IP gender gap will diminish. Moreover, if organizations such as Techbridge Girls keep records and follow-up with alumni, they could provide some of the data needed to understand and assess the scope and nature of the IP gender gap.

This type of initiative is a grand undertaking requiring significant resources, but the elements involved are among the most important things needed to bridge the gap. A public-private cooperative effort would likely produce the best results, especially in cases where education is government-led. Educating teachers and families should be the top priority for encouraging and training women; elements of this aspect could be scaled up to the national level. Resource materials or workshops could be useful ways for developing countries to meet this challenge. When educators are better equipped to provide girls with quality STEM-based education, this problem will be half solved.

If families, especially in regions where there are stigmas affecting women and girls, are taught about the importance and impact of girls entering STEM and receiving a quality education, these girls will be more likely to enter IP-related fields. And, of course, providing young women with career exploration, mentorship, educational and networking opportunities will ensure continuous encouragement and engagement, hopefully leading to long, innovative careers. Connecting upcoming female innovators with appropriate mentors and introducing them to their potential future work environments through corporate partnerships enhances training experiences and encourages continued involvement in STEM fields.

When social and educational changes, such as those needed to meet this challenge, are addressed on the national level through a public-private initiative, those changes are more likely to have a substantial effect.

Sources:

Baker, A. "It's Time for the USA Science & Engineering Festival." *scientificamerican.com*. Scientific American, Apr. 2, 2018. Web. <<https://blogs.scientificamerican.com/budding-scientist/its-time-for-the-usa-science-engineering-festival/>>.

McGrane, C. “‘Hidden Figures’ inspires hundreds of girls at special MLK Day showing,” *geekwire.com*. GeekWire, Jan. 16, 2017. Web. <<https://www.geekwire.com/2017/hidden-figures-inspires-hundreds-girls-special-mlk-day-showing/>>.

Techbridge Girls. “Home page.” Web. <<https://www.techbridgegirls.org>>.

### 4.3 ENCOURAGING WOMEN TO ENTER CAREERS IN IP LAW AND ADMINISTRATION

As described in section 3.3, women are less likely than men to enter careers in IP law and administration. Policies to address these specific issues appear to be less developed than in respect to other challenges. It may be that policies described in the other sections, such as helping women to succeed in STEM, raising awareness of IP and making targeted capacity-building efforts may also help to alleviate address these challenges indirectly (e.g., increasing the number of women in STEM increases the potential pool of IP professionals). In this section’s case study, we also describe a successful program in India for training IP professionals that provides a promising model.

One challenge to increasing the representation of women among patent agents, IP attorneys and IP managers is that in many cases, STEM credentials are preferred or required for these jobs. As a result, encouraging women to enter the STEM pipeline is particularly important and the programs described in section 4.2 may help to alleviate this challenge.

Moreover, women with STEM credentials need to be aware of the opportunities that exist in IP law and administration and to be trained and encouraged to pursue them. The following case study on a successful program in India may provide a template for programs elsewhere.

#### Case study: Training women to enter careers in IP

The Department of Science and Technology in India initiated the Women Science Scheme (WOS) in 2002 to counter the fact that women are less likely to be encouraged and trained to enter STEM fields or to receive the resources they need to succeed in business.<sup>1</sup> WOS was launched to address the gender gap created by career breaks related to motherhood and family responsibilities by providing women aged between 27 and 57 years of age with promising opportunities to re-enter the field of science and technology. The program offers three categories of fellowships with research grants: 1) WOS-A: Research in Basic/Applied Science; 2) WOS-B: Science and Technology interventions for Societal Benefit; and 3) WOS-C: Internship in IPRs. In 2014, the Department combined all of the programs specifically aimed at addressing various issues faced by female scientists, including WOS, under the Knowledge Involvement in Research Advancement through Nurturing program.

The internship in IPRs (WOS-C) offers one year of on-the-job training to develop female scientists capable of creating, protecting and managing IPRs in India. The program is open to Indian women with at least a bachelor’s degree in engineering, technology or the equivalent. It provides scholarships of varying levels according to whether the participant has a bachelors, masters or doctorate.

This project is overseen by the Patent Facilitating Centre of the Technology Information Forecasting and Assessment Council. The Council selects candidates and carries out an online test and personal interview in Delhi, before then providing training conducted by IPR professionals.

After the training, the participants are sent to various professional IPR firms and other institutions in Delhi, Pune, Chennai and Kharagpur. The participants are trained in the drafting and prosecution of patents, patent searches, how to prepare patent landscapes and other skills relevant to IPRs.

The women in this program have enjoyed successful careers in IP. Many of the women have successfully taken the patent agent exam conducted by the Indian Patent Office, thereby qualifying to become patent agents who may practice with the Indian Patent Office. Graduates can find jobs in law firms or businesses working with IPRs, while some have become entrepreneurs and work from home, and some have become IPR teachers.

From 2002 to 2018, approximately 600 women were trained by the program. Of these, 150 are now qualified patent agents. More than 60 per cent of the women are now gainfully employed. A number of them are self-employed.

The three-part WOS initiative addresses the lack of training and resources head-on by providing resources aimed specifically at enabling women innovators to learn and grow professionally. WOS-C is also aimed at addressing the lack of qualified women in IP law and administration roles, as well as the discrepancy in the awareness of women entrepreneurs of the relevance and value of IPRs to their careers. In addition, WOS-A and WOS-B both offer opportunities for women to advance in IP-intensive fields. This initiative therefore works to solve four of the five IP gender gap challenges presented in this paper.

The WOS is a government initiative, and it serves as an excellent example for other countries with similar resources. For developing countries, the most impactful results would be produced by similar initiatives seeking to help women to re-enter the workforce after breaks in their career and to educate women – especially the self-employed – on the importance, creation, protection and management of IPRs. Since the WOS initiative is a grant program, the model is also suitable for private companies and NGOs.

Sources:

Information regarding the program comes from the Women Scientists Programs of the Government of India (<<http://www.dst.gov.in/scientific-programmes/scientific-engineering-research/women-scientists-programs>>) and information supplied by Professor Prabuddha Ganguli, a longtime participant in the program.

#### 4.4 HELPING WOMEN TO UNDERSTAND THE VALUE OF IP TO THEIR WORK AND HOW TO USE THE SYSTEM

As discussed in section 3.3, people who are not IP specialists can find the system challenging to use and question its relevance to them. Educating women about the benefits of IPRs and how to use them can therefore help them to overcome a threshold barrier to closing the IP gender gap.

Two types of policies are relevant to meeting this challenge. The first type are programs to raise general awareness of IP among women. Several such programs exist but, as is often the case

with widely targeted awareness-raising campaigns, the results are difficult to assess. It is difficult to determine whether the program reached the right audience at the right time with information that motivated them to act. Nevertheless, if one wishes to close the IP gender gap, it seems wise to include IP education in forums and contexts where it is likely to be relevant to women.

The second type of policy that promotes IP use to women is more targeted engagement and capacity-building designed to address an identified community that might benefit from use of IP and/or to provide IP-related services and advice to women at the time they are needed. These types of interventions are more resource-intensive, but the results are promising. In this instance, it may be too early to identify best practices, but successful policies could be mirrored and duplicated.

### *Awareness-raising programs*

One awareness-raising strategy is to educate women about IP rights as early in life as possible. Studies have shown that if girls were as exposed to female inventors as boys are to male inventors, the innovation gender gap could be reduced by as much as half.<sup>126</sup> Efforts such as the Girl Scouts Intellectual Property Patch,<sup>127</sup> established in 2014 in the United States to educate girls about the creation and protection of IP with a focus on STEM careers, can help to equip women and girls with a better understanding of the principles of IP, along with the tools to protect their IP.

Another strategy is to establish educational programs that can be offered to interested parties. The WIPO Academy,<sup>128</sup> which offers tailored training in IPR for everyone from grade school children to government officials, is one such program. Some of the WIPO Academy's programs are online, which is increasingly becoming a way to reach groups, such as women, who may be underrepresented in networks and settings where knowledge of IPRs are more widespread.

The Canadian Intellectual Property Office (CIPO) has been executing a national IP strategy it launched in April 2018, which includes a range of measures to support underrepresented groups in the IP ecosystem, including women. For instance, CIPO has been organizing new educational and awareness-raising initiatives to help Canadians to better understand and exploit IPRs, and integrate their use into their business strategies. Efforts have been made to develop initiatives specifically targeting women, such as the development of case studies tailored to women entrepreneurs. To this end, in 2018, CIPO hosted six World IP Days across the country that celebrated women inventors.<sup>129</sup>

One example of an IP awareness-raising program that has enjoyed success by some metrics, although the impact is difficult to measure, is the Korea International Women Inventors Exposition, presented in the box below.

---

<sup>126</sup> Bell, A., Chetty, R., Jaravel X., Petkova, N. and Reenen, J.V. "Lost Einsteins: How exposure to innovation influences who becomes an inventor." *voxeu.org*. VOX CEPR Policy Portal, Dec. 24, 2017. Web. <<https://voxeu.org/article/how-exposure-innovation-influences-who-becomes-inventor>>.

<sup>127</sup> USPTO. "Girl Scouts IP Patch." *uspto.gov*. Web. <<https://www.uspto.gov/kids/patchFAQ.html>>.

<sup>128</sup> WIPO Academy. "Homepage." *wipo.int*. Web. <<https://www.wipo.int/academy/en/>>.

<sup>129</sup> Transcript of WIPO CDIP meeting, *op cit.*, November 2018.

## Case study: Showcasing female inventors to encourage use of the IP system

In December 2002, the Republic of Korea found that women had filed only 4 per cent of all patent applications. Recognizing the lost potential value of women's inventions, the Korean Intellectual Property Office (KIPO) set out to educate women about IPRs and encourage them to invent and protect their inventions. The Korean Women Inventors Association was formed to support female entrepreneurs to grow their businesses and obtain economic independence by using IPRs to help them to fulfill their potential. Starting in 2008, the Association, supported by WIPO and hosted by KIPO in Seoul, has presented the Korea International Women Inventors Exposition. This annual event has grown over the years.

The Exposition serves several purposes. In part, it offers space for female innovators and entrepreneurs to exhibit their inventions and products, promote sales and facilitate network-building. To be eligible, applicants must show proof of an application or registration of IP in the Republic of Korea or abroad.

The Exposition also provides training opportunities in IP protection, such as the "IP Wave for Creative Women Leaders" workshop for female inventors and business leaders who have already completed the WIPO IP management training that teaches skills on developing new ideas and protecting their IP, and the Invention Forum where inventors can network and learn about examples of successful business expansions.

The event has been successful in terms of attendance and interest. It was originally held over two days and now has doubled in length to become a four-day exposition and presentation. Participation has stayed fairly steady since its launch in terms of the number of exhibitors and international countries represented. In 2019, 347 inventions were submitted by women from 28 different countries and more than 7,000 visitors attended.

The long-term impact of the Exposition on contributing to closing the IP gender gap is more difficult to determine. Although it continues to draw large crowds of attendees, the numbers have dropped significantly since the inception of the event. Little research has been done or discussed by KIPO about tangible results from the training and exposure women receive through the Exposition. Further research remains needed to reveal whether the Exposition's offerings are enough to encourage more women to protect and commercialize their IP.

### Sources:

WIPO. "Leading the Way for Inventive Women in Korea And Beyond." *wipo.int*. Jul. 29, 2016. Web. <[https://www.wipo.int/women-and-ip/en/news/2016/news\\_0005.html](https://www.wipo.int/women-and-ip/en/news/2016/news_0005.html)>.

Korea International Women's Invention Exposition. "Overview - English." *kiwie.or.kr*. Web. <<http://kiwie.or.kr/newkiwie/eng/exposition/infor.asp>>.

Korean Intellectual Property Office. "2018 Annual Report." *kipo.go.kr*. Apr. 2019. Web. <[https://www.kipo.go.kr/upload/en/download/annualreport\\_2018.pdf](https://www.kipo.go.kr/upload/en/download/annualreport_2018.pdf)>.

### *Targeted capacity-building*

Beyond raising awareness about IP protection, another strategy to encourage women to protect their innovations is to offer financial and technical assistance with tasks such as patent prosecution in order to dispel concerns about the difficulty and expense of navigating the IP system. Qualitative research suggests that people perceive the process and cost associated with pursuing IP protection to be intimidating and burdensome, with few guarantees of payoff for their efforts.<sup>130</sup>

In Peru, the Government has promoted the use of “collective trademarks”, which a growing number of women are using to protect their market position. The National Institute for the Defense of Competition and Protection of Intellectual Property (INDECOPI), created the “*Mujeres en sus marcas*” (“Women, on your marks”) campaign to raise awareness of these important tools. Between 2010 and 2018, according to INDECOPI, 212 out of a total of 937 registered collective marks were owned by groups of women, with the biggest increase recorded in 2018. These collective marks can be registered with the support of a specialized INDECOPI service for entrepreneurs. To provide one example, the *Asociacion de Mujeres Organizadas Choco Warmis* (Choco Warmis Organized Women’s Association), representing female producers from a specific region of Peru who are commercializing cocoa and coffee, obtained a collective mark in order to boost the group’s competitive position.<sup>131</sup>

The USPTO offers two programs that provide technical assistance with IP rights as a result of the 2011 America Invents Act: the Pro Se Assistance Program and the Patent Pro Bono Program. The Pro Se Assistance Program is designed to help patent applicants who are filing without the help of a registered attorney or agent. The program includes application checklists, a tutorial about the online system and in-person assistance by phone or face-to-face.<sup>132</sup>

The Patent Pro Bono Program provides free legal assistance with the preparation and filing of patent applications for applicants below a certain income threshold.<sup>133</sup> Kelly Bray, Director of Legal Services for Georgia Lawyers for the Arts, which administers the Patent Pro Bono Program for the states of Georgia, South Carolina and Tennessee, said that roughly 60 per cent of applicants to the program so far have been women.<sup>134</sup> She added that offering in-person services where women could discuss their invention one-on-one alleviated some of the intimidation women felt about the patenting process.<sup>135</sup>

Throughout the United States, law schools offer legal clinics that provide services to entrepreneurs. A number of these offer patent services, while others target the arts. These clinics can be a boon to underrepresented groups – including women – who find it challenging to access the IP system. Since women generally have access to less capital and resources than others, as discussed in section 3.2, such assistance can disproportionately affect women in a positive manner.

---

<sup>130</sup> National Women’s Business Council, *op cit.*, 2018.

<sup>131</sup> INDECOPI, *op cit.*, 2018.

<sup>132</sup> USPTO. “Filing a patent application on your own: Pro Se Assistance Program.” *uspto.gov*. Web. <<https://www.uspto.gov/patents-getting-started/using-legal-services/pro-se-assistance-program>>.

<sup>133</sup> USPTO. “Patent Pro Bono Program for independent investors and small businesses.” *uspto.gov*. Web. <<https://www.uspto.gov/patents-getting-started/using-legal-services/pro-bono/patent-pro-bono-program>>.

<sup>134</sup> Bray, *op cit.*, 2019.

<sup>135</sup> *Ibid.*



NGOs and private companies may also provide targeted capacity-building. Microsoft launched its #MakeWhatsNext program to encourage girls to stay in STEM.<sup>136</sup> This includes a patent program to simplify the process of applying for a patent through step-by-step guidelines and pro bono legal assistance. The program has supported with patenting to innovation teams led by women and girls from around the world since 2016 and boasts one granted patent and nine patents pending.

As noted above, a 2016 initiative sponsored by the Kenya Industrial Property Institute and WIPO trained 100 rural basket weavers in quality control, branding and IP. As a result, the group formed a collective, acquired a trademark and increased their sales price by 66 per cent.<sup>137</sup> This program appears to offer a particularly promising model, and is profiled in the case study that follows.

#### Case study: Providing IP capacity-building to female artisans in rural Kenya

One of the primary barriers preventing women protecting their IP is that they are unaware that IP can be protected or question the value of protecting their IP. In Taita Taveta county in Kenya, woven *sisal* baskets are an iconic artisanal product from the region. Most women making the baskets, however, were only able to earn supplemental income, rather than a full-time living, from their handicrafts, owing to counterproductive business practices.

In 2016, WIPO, the Japan Patent Office, the Japan International Cooperation Agency, the Kenya Industrial Property Institute, the One Village One Product Program Kenya and the Taita Taveta county government launched a branding project to increase the return of the Taita basket weavers on their labor.

WIPO and the Government of Kenya identified a group of rural basket weavers in Taita Taveta county who had struggled to sell their baskets at their preferred price, thereby losing much of their margin to brokers, and were only able to produce at a small-scale. The sponsoring organizations partnered to train 30 female leader basket weavers from villages in Taita Taveta county on the trademark system, and standards and quality control for branding products. Additionally, WIPO conducted workshops for more than 400 female basket weavers, including discussions on creating a basket weavers' association, logo design, trademark regulations on the use of the mark and quality standards.

Following the training and workshop, the group formed the Taita Baskets Association. The Association was able to trademark a logo to protect their brand, covering 20 types of non-metal baskets and 21 types of baskets for domestic use, purchase supplies in bulk and devise a uniform set of quality and esthetic standards. Whereas the group used to earn an average of 900 Kenyan shillings – about 9 United States dollars – per basket, they can make up to 1,500 shillings – about 14 dollars – or even 2000 shillings – nearly 20 dollars – in international markets. Most of the more than 400 women in the collective are now producing baskets as their full-time job, with some of them having even supplanted their husbands as breadwinners.

The Taita Baskets Association is largely a success story, materially improving the lives and income opportunities of the women affected. The program itself, which began planning in 2015

---

<sup>136</sup> Microsoft. "Make What's Next Homepage." *microsoft.com*. Web. <<https://www.microsoft.com/en-us/philanthropies/make-whats-next>>.

<sup>137</sup> Kirui, D. "How a Trademark Helped Women in Kenya Make a Business from Baskets." *newsdeeply.com*. News Deeply, Apr. 26, 2018. Web. <<https://www.newsdeeply.com/womensadvancement/articles/2018/04/26/how-a-trademark-helped-women-in-kenya-make-a-business-from-baskets>>.

and was carried out throughout 2016 and into 2017, cost an estimated 80,000 United States dollars to execute. The results for the participants was overwhelmingly positive. One benefit of this sort of one-time intervention is that it creates human capital regarding the value and use of the IP system that can pay dividends for years to come and may even spread to other ventures in the community. It appears that it could be applicable in many countries.

Sources:

Kelly, S. "Weaving a Way Forward." *wipo.int*. World Intellectual Property Organization. Web. <[https://www.wipo.int/cooperation/en/funds\\_in\\_trust/japan\\_fitip/taita\\_basket\\_branding.html](https://www.wipo.int/cooperation/en/funds_in_trust/japan_fitip/taita_basket_branding.html)>

Kirui, D. "How a Trademark Helped Women in Kenya Make a Business from Baskets." *newsdeeply.com*. News Deeply, Apr. 26, 2018. Web. <<https://www.newsdeeply.com/womensadvancement/articles/2018/04/26/how-a-trademark-helped-women-in-kenya-make-a-business-from-baskets>>.

#### 4.5 PROVIDING WOMEN WITH MENTORING AND OPPORTUNITIES FOR ADVANCEMENT IN IP-INTENSIVE FIELDS

As discussed in section 3.5, even when women successfully enter IP-intensive fields, they may find staying and succeeding in those fields to be challenging owing to several obstacles. Section 3.5 describes three obstacles to success that are specific to women:

- Women lack the role models, mentoring and networking opportunities that their male colleagues enjoy.
- Expectations and demands based on gender roles may make it difficult to stay in demanding, IP-intensive fields.
- Female researchers are less likely to be encouraged to commercialize their inventions.

While there are some policies and initiatives intended to address these challenges, there are likely to be no simple solutions. The obstacles are often subtle and related to larger social and economic issues. The solutions, particularly with respect to mentoring, often require the dedicated participation of many and significant individual effort. Nevertheless, there are some successful initiatives with respect to networking that provide templates for future efforts.

##### *Providing networking and mentoring opportunities*

Mentorships and professional connections are vital for success in any field. By providing these sorts of networking opportunities, policymakers, NGOs and companies can help women entrepreneurs to succeed in business and innovation. For example, the Nigeria-based Geek Girls Collaborative, founded by the non-profit NGO iTEE, has combined a team of volunteers and professionals to develop a network of female students and mentors for the purpose of motivating and increasing female involvement in technology.<sup>138</sup> Successful endeavors such as this, Akili Dada (a "leadership incubator" based in Kenya)<sup>139</sup> and Techbridge Girls (profiled in section 4.2) all rely heavily on mentorship and networking. In fact, Techbridge Girls has teamed up with companies and non-profits such as Boeing, Chevron, Cisco and the Society of Women Engineers

---

<sup>138</sup> Geek Girls Collaborative. "About us." *computergeeky.org*. Web. Jul. 5, 2019. <<https://www.computergeeky.org/about.html>>.

<sup>139</sup> Rasi, N. "The Value of Mentorship." *akilidada.org*. Akili Dada, 2020. Web. <<http://www.akilidada.org/the-value-of-mentorship/>>.

to provide hands-on opportunities to girls, including career exploration opportunities that directly connect the girls with professional, female mentors.<sup>140</sup>

There are many organizations around the world dedicated to women's professional networking, such as Polaris, the Young Women's Leadership and Mentoring Initiative, the Organization for Women in Science in the Developing World, Women in Technology International, She.Leads.Africa and Womena.<sup>141</sup> Often, these programs also include mentoring to encourage networking to begin early on. Opportunities such as all-women workshops, conferences, meet-and-greets and contact lists of influential mentors and sponsors that are readily available and easily accessible by women entrepreneurs, especially those in secondary or tertiary institutions preparing for careers in IP-related fields, will present women with significant opportunities for advancement.

Private efforts to provide networking and mentoring tend to make a greater impact than government initiatives for two reasons. First, they require volunteer participation from private individuals and mission-driven dedication from those individuals. NGOs, trade associations and other voluntary organizations in civil society are typically where such civic engagement arises.

However, governments can do some things to help such programs to scale up. For example, to the extent they require travel or time off work, participants usually fund their own efforts. Governments might provide funding directly or incentives to businesses to encourage employees to participate.

Both governments and civil society should thus consider establishing mentoring programs, support groups and inclusive networking events with the specific goal of addressing the IP gender gap. For developing or low-resource countries, connecting experts with mentees could be as simple as collecting and dispersing volunteered contact information. Women entrepreneur support groups could be simple meetings led by volunteer, female leaders held in civic centers or homes in remote regions. Networking events could also be simple meetings held in civic centers or central locations within the region. The key is encouraging experts to participate and providing women with the opportunity to expand their knowledge and capacities.

Another issue to consider is the shortage of women who are senior enough to provide mentoring and networking opportunities. While many programs are envisioned as women-to-women programs, women will likely benefit if men also do their part as mentors. The participation of all genders in mentoring women would provide women with access to powerful networks and to senior colleagues with the most relevant and helpful experience.

These are just some of the many ways in which policymakers, NGOs and companies can provide women with the networking opportunities they need to succeed. This section also presents a case study of Polaris, an international network of men and women successfully working to advance women entrepreneurs.<sup>142</sup> Creating networks specifically designed for advancing women innovators, creators and entrepreneurs will have a positive impact on economics, knowledge capital and innovation.

---

<sup>140</sup> Techbridge Girls, "Homepage", *op cit*.

<sup>141</sup> Polaris. "Who we are." *polaris.community*. Web. <<https://polaris.community/about/>>; Global Fund for Women. "About The Future Is Ours: Young Women Leaders." *globalfundforwomen.org*. 2019. Web. <<https://www.globalfundforwomen.org/young-women-leaders/>>; Organization For Women In Science For The Developing World. "What is OWSD?" *owsd.net*. Web. Jul. 31, 2019. <<https://owsd.net/about-owsd/what-owsd/>>; Women in Technology International. "About WITI." *witi.com*. Web. <<https://www.witi.com/about/>>; She Leads Africa. "About Us." *sheleadsafrica.org*. 2016. <<https://sheleadsafrica.org/aboutus/>>; Womena. "About Us." *womena.com*. Web. <<https://womena.com/about-us/>>.

<sup>142</sup> Polaris, "Who We Are", *op cit*.

The mentoring and networking initiatives described here are essential to helping women to increase their rates of success in demanding, IP-intensive fields. There are proven existing programs that can be expanded or used as models.

The challenge with such initiatives is that they are resource-intensive. Good mentoring takes one-on-one contact, time and the right “fit” between mentor and mentee. As a result, while these programs are very much needed and productive, they do not scale up easily.

### *Helping women to succeed and stay in IP-intensive careers*

Gender role expectations and deeply held personal values can pit the needs of family life against women’s career success. Company policies or legislative requirements can incentivize female innovators to continue working by offering work-life balance options and accommodations. Policies directed specifically at women entail some stigma. By removing gender-specific policy and regulatory restrictions, while providing family-friendly incentives such as affordable childcare, flexible hours and work arrangements, and government-mandated paid family leave for both parents, women innovators can continue to make breakthroughs while ensuring that their families’ needs are met.<sup>143</sup> These policies should be available to both parents so that choices can be made within families, without the onus being on women to be the primary caregivers.

Several highly successful companies, including IBM, Reddit, Microsoft, Adobe, Amazon and Netflix, offer these sorts of work-life balance benefits. Reddit offers paid leave for birth, adoptive or foster parents, with additional time off for birth mothers to physically recover, as well as flexible time off, on-site breastfeeding rooms, childcare stipends, reimbursement for and access to certain parent-based services and adoption assistance, among several other benefits. The popular Internet-based company, valued at approximately 1.8 billion United States dollars, also “boasts a nearly 100 per cent return rate of new parents”.<sup>144</sup>

Beyond individual corporate policies, national governments can mandate family leave policies and other accommodations to help women to succeed in their careers. Of course, the considerations that motivate such policymaking are broad and go far beyond concerns regarding the IP gender gap.

### *Encouraging women to commercialize their inventions*

As discussed in section 3.5, female researchers have lower rates of commercialization for their inventions in academic settings. Educating women on the purpose of TTOs and the services they offer can encourage women to take the first step toward commercializing their IP. Likewise, policies and practices that help and incentivize female use of TTOs across the public and private sectors will support women’s management of IP.

In 2014, Washington University in St. Louis created the Women in Innovation & Technology program,<sup>145</sup> seeking to reconcile the disparity between male and female use of TTOs at the university. The program tracks female engagement with the TTO and addresses several challenges by: (1) inviting female scientists to participate in technology transfer and the

---

<sup>143</sup> Boushey, H. “Family Friendly Policies: Helping Mothers Make Ends Meet.” *Review of Social Economy* 66 (2008): pp. 51-70. Print.

<sup>144</sup> Lotze, K. “10 tech companies with generous parental leave benefits.” *techrepublic.com*. Tech Republic, Feb. 15, 2019. Web. <<https://www.techrepublic.com/article/10-tech-companies-with-generous-parental-leave-benefits/>>.

<sup>145</sup> Sohar, *op cit.*, 2018.

commercialization of their academic work; (2) providing an educational component; (3) offering an internal network of female peers that engage in technology transfer; and (4) developing an external network of community individuals and peers at other institutions who can serve as mentors, facilitators or points of engagement.

Dr. Nichole Mercier, the Assistant Vice Chancellor and Managing Director for the Office of Technology Management at Washington University in St. Louis, United States, reiterated the importance of data and trend-tracking to narrowing the gender gap, stating, “TTOs must critically understand how women participate in technology transfer activities at their own institution, and seek to enhance participation with purposeful direction”.<sup>146</sup>

#### Case study: Providing women with networking, mentoring and advancement opportunities

Since November 2016, Polaris has been working to provide women with networking, mentoring and advancement opportunities. This inclusive network is based in the Netherlands, and according to its website:

“We strive to have a direct impact on women in business and a global impact to empower women in society. We are focused on making [a] difference by bridging the gender equality gap, especially in leadership positions”.

The organization is comprised of approximately 350 men and women spanning 23 different nationalities and with diverse career backgrounds. It focuses on mentoring, diversity in leadership, networking, career brokerage and peer-to-peer coaching. All of these endeavors include relevant, targeted events. Polaris offers women a one-year mentorship program that includes mentoring training, six or more personal sessions with an expert mentor and three mentoring events. The organization’s Career Brokerage initiative and its Circle of Choices peer-to-peer coaching program both seek to create safe, confidential and encouraging environments for women to voice their ambitions, acknowledge their achievements, help each other with career advancement, discuss business or personal issues in monthly small group meetings and ultimately reach their full potential.

Through its second annual mentorship program in 2018, Polaris provided 76 women with mentors. Since its inception in February 2018, Polaris’ small peer-to-peer group has initiated three rounds, each of which engages 10 to 12 women. The organization’s events continuously draw more than 100 participants, empowering women through discussions and speeches by successful women entrepreneurs, and building meaningful relationships. Its website hosts a blog highlighting events, members’ personal experiences, and articles and podcasts showcasing and providing advice for women entrepreneurs.

Organizations such as Polaris significantly contribute to solving the lack of mentoring and advancement opportunities for women by providing education, assistance and a broader network. Such opportunities significantly contribute to solving many of the general challenges faced by women entrepreneurs; when a network is inclusive yet focuses on bridging the gender gap and spans several sectors, it enables access to greater opportunities not generally available to most women entrepreneurs.

---

<sup>146</sup> Jefferson, B. “Gender parity in tech transfer.” *source.wustl.edu*. The Source, Jun. 18, 2018. Web. <<https://source.wustl.edu/2018/06/gender-parity-in-tech-transfer/>>.

Polaris has set an excellent example of the potential of women entrepreneurs when they have access to a broad, inclusive network and opportunities for mentorship. Even though their exact model may not be easily duplicated in certain regions and economies, the concepts can be adapted to meet local needs.

Sources:

Polaris. "Home page." Web. <<https://polaris.community>>.

## 5.0 CONCLUSION

This report was commissioned by WIPO to identify, for the consideration of Member States, promising policies to enhance access to and the effective use of IPRs by women inventors, creators and entrepreneurs. It identifies public and private initiatives that show promise for reducing the IP gender gap. Drawing on earlier research, we were able to identify five groups of challenges that underlie the IP gender gap:

1. There is a lack of the data needed to understand the scope and nature of the IP gender gap.
2. Women are less likely to be encouraged and trained to enter STEM fields or receive the resources they need to succeed in business.
3. There is a low level of awareness of the relevance and value of IP rights.
4. Women are less likely to enter careers in IP law and administration or to feel well served by national IP offices.
5. Women are less likely to receive mentoring and opportunities for advancement in IP-intensive fields.

This report examines in brief a range of policies that have attempted to address each of these challenges. The intensity with which each of these challenges has been addressed, as well as the success of the measure, varies.

The issues that policymakers may wish to prioritize are data-collection and making the IP office friendlier to female inventors, creators and entrepreneurs. With regard to data, current data-collection practices are sufficient to indicate that an IP gender gap exists – but its size is unknown in many countries, and in relation to all types of IPRs. In general, to address the IP gender gap, it would be useful to know more about who is most affected, and when and how they are affected. The IP office programs that exist to support access by women to the IP system seem largely focused on outreach and awareness. While those goals are laudable, women might benefit from more targeted, specific assistance. Data would undoubtedly support efforts to get the right measures in place. Moreover, experimentation by policymakers at different levels of government and targeting different sectors, as well as efforts by private sector actors, may be required in order to measure the impact of different interventions.<sup>147</sup>

---

<sup>147</sup> Madl, A.C. and Ouellette, L.L. "Policy Experiments to Address Gender Inequality Among Innovators." *Houston Law Review* 57.4 (2020): pp. 813-841. Web. <<https://ssrn.com/abstract=3505012>>.

Some of the programs we have identified in this paper are particularly promising, including those below. While several are not government programs, they can nonetheless provide models that could be emulated by policymakers.

- Programs to mentor girls to encourage them into STEM: Techbridge Girls is a good example of such a program that has successfully reached many young women. The challenge with such a program is that it is resource-intensive and continually requires new students to be reached.
- The Women Science Scheme in India: Internships in IPRs have successfully led women into careers as patent agents and IP attorneys. This is another program that is somewhat resource-intensive but that yields good results.
- Polaris' networking scheme appears to have reached many women, connecting them with their peers and showing them how to succeed.

There are many more promising policies discussed throughout this report. While, as a global IP community, we are in the early stages of addressing the IP gender gap, the challenges are generally known, if not as well understood as they should be owing to a lack of data. Based on what has been tried so far, policymakers can consider enacting their own versions of others' programs and policies. What is clear is that the IP gender gap will take many decades to resolve without targeted action to address it. Programs should be adopted to make progress towards closing it more quickly.

## BIBLIOGRAPHY

- American Bar Association IP Section. "Letter in Response to USPTO's Request for Comments and Notice of Public Hearings on the Report Required by the Study of Underrepresented Classes Chasing Engineering and Science ("SUCCESS") Act of 2018 – Initial Assignee Data." *uspto.gov*. Jun. 28, 2019. Web. <[https://www.uspto.gov/sites/default/files/documents/SUCCESSAct-ABA-IPL\\_0.pdf](https://www.uspto.gov/sites/default/files/documents/SUCCESSAct-ABA-IPL_0.pdf)>.
- Anita Borg Institute. "Pass It On Awards Program." *anitab.org*. Web. Aug. 1, 2019. <<https://anitab.org/awards-grants/pass-it-on-awards-program>>.
- Asian Women In Business. "Asian Women In Business Scholarship Fund." *awib.org*. Web. Aug. 1, 2019. <<http://www.awib.org/index.cfm?fuseaction=page.viewPage&pageID=811&nodeID=1>>.
- Bair, S.P. "Impoverished IP." *Ohio State Law Journal* (forthcoming, 2019).
- Baker, A. "It's Time for the USA Science & Engineering Festival." *scientificamerican.com*. Apr. 2, 2018. Web. <<https://blogs.scientificamerican.com/budding-scientist/its-time-for-the-usa-science-engineering-festival>>.
- Barne, D. "Ethiopian Women Gain Status Through Landholding." *Gender Equality as Smart Economics*. World Bank. Oct. 1, 2010. Web. <<http://documents.worldbank.org/curated/en/697371468157497455/pdf/579960NEWS0GA P101PUBLIC10BOX353785B.pdf>>.
- Bartow, A. "Patent Law, Copyright Law, and the Girl Germs Effect." *St. John's Law Review* 90 (2016): pp. 579-608. Web. Apr. 3, 2019. <[https://scholars.unh.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1260&context=law\\_facpub](https://scholars.unh.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1260&context=law_facpub)>.
- Beede, D.N., et al. *Women In Stem: A Gender Gap To Innovation*. U.S. Department of Commerce, Economics and Statistics Administration, Washington D.C., 2011. Issue Brief No. 04-11. Print.
- Bell, A., Chetty, R., Jaravel, X., Petkova, N. and Reenen, J.V. "Lost Einsteins: How exposure to innovation influences who becomes an inventor." *voxeu.org*. VOX CEPR Policy Portal, Dec. 24, 2017. Web. <<https://voxeu.org/article/how-exposure-innovation-influences-who-becomes-inventor>>.
- Bertrand, M. and Millainathan, S. "Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination." *The American Economic Review* 94.4 (2004): pp. 991-1013. Print.
- Boushey, H. "Family Friendly Policies: Helping Mothers Make Ends Meet." *Review of Social Economy* 66 (2008): pp. 51-70. Print.
- Brachmann, S. "IP Awareness and Attitudes: A Summary of Research and Data." *understandingip.org*. The Center for Intellectual Property Understanding. Apr. 2019. Web.



<<http://www.understandingip.org/wp-content/uploads/2019/03/IP-Awareness-and-Attitudes.pdf>>.

Brauneis, R. and Olliar, D. “An Empirical Study of the Race, Ethnicity, Gender and Age of Copyright Registrants.” *The George Washington Law Review* 86.1 (2018): pp. 101-154. Web.

<[https://www.law.nyu.edu/sites/default/files/upload\\_documents/Brauneis%20and%20Olliar.pdf](https://www.law.nyu.edu/sites/default/files/upload_documents/Brauneis%20and%20Olliar.pdf)>.

Bray, K. “Georgia pro-bono patent system helps women inventors.” K. Marathe: interviewer. Mar. 27, 2019.

Burk, D.L. “Diversity Levers.” *Duke Journal of Gender Law & Policy* 23.1 (2015): pp. 25-43. Print.

Burk, D.L. “Bridging the gender gap in intellectual property.” *wipo.int*. WIPO Magazine, Apr. 2018. Web. Mar. 28, 2019.

<[https://www.wipo.int/export/sites/www/wipo\\_magazine/en/pdf/2018/wipo\\_pub\\_121\\_2018\\_02.pdf](https://www.wipo.int/export/sites/www/wipo_magazine/en/pdf/2018/wipo_pub_121_2018_02.pdf)>.

Catalyst. “Women in the Workforce – Global: Quick Take” *catalyst.org*. Jan. 30, 2020. Web. <<https://www.catalyst.org/research/women-in-the-workforce-global/>>.

Chien, C.V. “Inequality, Innovation, and Patents.” Santa Clara Univ. Legal Studies Research Paper No. 2018-03 (2018). Web.

<[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3157983](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3157983)>.

Ciccatelli, A.G. “Are Women Under-Represented in IP Litigation?” *ipwatchdog.com*. IP Watchdog. Feb. 7, 2018. Web. <<https://www.ipwatchdog.com/2018/02/07/women-under-represented-ip-litigation/id=93243/>>.

CloQ. “Home page.” Web. <<https://cloq.app/>>.

Cook, L.D and Kongcharoen, C. “The Idea Gap in Pink and Black.” *National Bureau of Economic Research*, Working Paper No. 16331 (2010). Print.

Corrado, C.A., Hulten, C. and Sichel, D. “Intangible Capital and U.S. Economic Growth.” *The Review of Income and Wealth* 55.3 (2009): pp. 661-685. Print.

Corrado C.A. Barnes, P. and McClure, A. “Investments in Intangible Assets and Australia’s Productivity Growth” (Productivity Commission Staff, Working Paper). *pc.gov.au*. Australian Government Productivity Commission. 2009. Web.

<<http://www.pc.gov.au/research/supporting/intangible-investment/intangible-investment.pdf>>.

Couch, S., Estabrooks, L.B. and Skukauskaitė, A. “Addressing the Gender Gap Among Patent Holders through Invention Education Policies.” *Technology and Innovation* 19.4 (2018): pp. 735-749. Web. Feb. 28, 2019.

<<https://www.ingentaconnect.com/content/nai/ti/2018/00000019/00000004/art00009>>.

- Crouch, D. "Progress and Potential: A profile of women inventors on U.S. patents." *patentlyo.com*. PatentlyO blog. Feb. 11, 2019. Web. Apr. 1, 2019. <<https://patentlyo.com/patent/2019/02/progress-potential-inventors.html>>.
- Cutura, J. *Challenges for Women Inventors and Innovators in Using the Intellectual Property System: A Review of Literature*. World Intellectual Property Organization, forthcoming, 2019.
- Demiralp, B., Morrison, L. T. R. and Zayed, S. "On the Commercialization Path: Entrepreneurship and Intellectual Property Outputs Among Women in Stem". *Technology and Innovation* 19.4 (2018): pp. 707-726. Web. Mar. 1, 2019. <<https://www.ingentaconnect.com/content/nai/ti/2018/00000019/00000004/art00007>>.
- Dezsö, C.L. and Ross, D.G. "Does Female Representation in Top Management Improve Firm Performance? A Panel Data Investigation." *Strategic Management Journal* 33.9 (2012): pp. 1072-1089. Web. Mar. 29, 2019. <[https://www0.gsb.columbia.edu/mygsb/faculty/research/pubfiles/3063/female\\_representation.pdf](https://www0.gsb.columbia.edu/mygsb/faculty/research/pubfiles/3063/female_representation.pdf)>.
- Ding, W., Murray, F. and Stuart, T. "Gender Differences in Patenting in the Academic Life Sciences." *Science* 313.5787 (2006): pp. 665-667. Print.
- Ding, W., Murray, F. and Stuart, T. "From Bench to Board: Gender Differences in University Scientists' Participation in Corporate Scientific Advisory Boards." *Academy of Management Journal* 56.5 (2013): pp. 1443-1464. Print.
- Else, H. "Nearly half of U.S. female scientists leave full-time science after first child." *nature.com* Nature International Journal of Science, Feb. 19, 2019. Web. <<https://www.nature.com/articles/d41586-019-00611-1>>.
- European Commission. "Female entrepreneurs." *ec.europa.eu*. Web. Aug. 2, 2019. <[https://ec.europa.eu/growth/smes/promoting-entrepreneurship/we-work-for/women\\_en](https://ec.europa.eu/growth/smes/promoting-entrepreneurship/we-work-for/women_en)>.
- European Commission. "European Network to Promote Women's Entrepreneurship (WES) Activity Report." *ec.europa.eu*. 2012. Web. <[https://ec.europa.eu/docsroom/documents/5379/attachments/1/translations/en/renditions/pdf&ved=2ahUKEwjj\\_fzXoJXkAhUQWq0KHQ2GDEEQFjAAegQIBhAB&usq=AOvVaw1w0JSC6znzbfqP5riS3pcQ](https://ec.europa.eu/docsroom/documents/5379/attachments/1/translations/en/renditions/pdf&ved=2ahUKEwjj_fzXoJXkAhUQWq0KHQ2GDEEQFjAAegQIBhAB&usq=AOvVaw1w0JSC6znzbfqP5riS3pcQ)>.
- Fechner, H. and Shapanka M.S. "Closing Diversity Gaps in Innovation: Gender, Race, and Income Disparities in Patenting and Commercialization of Inventions." *Technology and Innovation* 19.4 (2018): pp. 727-734. Web. Apr. 1, 2019. <[https://www.cov.com/-/media/files/corporate/publications/2018/06/closing\\_diversity\\_gaps\\_in\\_innovation\\_gender\\_race\\_and\\_income\\_disparities\\_in\\_patenting\\_and\\_commercialization\\_of\\_inventions.pdf](https://www.cov.com/-/media/files/corporate/publications/2018/06/closing_diversity_gaps_in_innovation_gender_race_and_income_disparities_in_patenting_and_commercialization_of_inventions.pdf)>.
- Flaherty, C. "Smaller Pots for Women." *insidehighered.com*. Inside Higher Ed, Mar. 6, 2019. Web. <<https://www.insidehighered.com/news/2019/03/06/new-study-nih-funding-says-women-get-smaller-grants-men>>.

- Frietsch, R., Haller, I., Funken-Vrohling, M. and Grupp, H. "Gender Specific Patterns in Patenting and Publishing." *Research Policy* 38.4 (2009): pp. 590-599. Print.
- Gaillot, A. "The Venture Capital World Has A Problem With Women of Color." *girlboss.com*. GirlBoss, Jan. 21, 2019. Web. <<https://www.girlboss.com/identity/venture-capital-women-of-color>>.
- Geek Girls Collaborative. "About us." *computergeeky.org*. Web. Jul. 5, 2019. <<https://www.computergeeky.org/about.html>>.
- GirlUp. "WiSci Girls STEAM Camp." *girlup.org*. Web. Jul. 5, 2019. <<https://www.girlup.org/wisci/#sthash.mqfQPOul.dpbs>>.
- Girma, H. and Giovarelli, R. "Brief: The Gender Implications of Joint Titling in Ethiopia." *focusonland.com*. Focus on Land in Africa, 2019. Web. <<http://www.focusonland.com/foia/en/countries/brief-the-gender-implications-of-joint-titling-in-ethiopia/>>.
- Global Fund for Women. "Women's Funds" *globalfundforwomen.org*. 2019. Web. <<https://www.globalfundforwomen.org/our-approach/womens-funds/#.XD4Y01xKg2w>>.
- Global Fund for Women. "About The Future Is Ours: Young Women Leaders." *globalfundforwomen.org*. 2019. Web. <<https://www.globalfundforwomen.org/young-women-leaders/>>.
- Government of India. "Women Scientists Programs." *dst.gov.in*. Department of Science and Technology. Web. <<http://www.dst.gov.in/scientific-programmes/scientific-engineering-research/women-scientists-programs>>.
- Graduate Women International. "Home page." Web. <<https://graduatewomen.org/>>.
- Graham, S.J.H., Merges, R.P., Samuelson, P. and Sichelman, T.M. "High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey." *Berkeley Technology Law Journal* 24.4 (2009): pp. 255-327. Print.
- Guibourg, C. and Stylianou, N. "Why are so few women inventors named on patents?" *bbc.com*. BBC News, Oct. 2, 2019. Web. <<https://www.bbc.com/news/technology-49843990>>.
- Hanes, S., Ku, K., Primiano, L. and Arvin, A. "Gender Analysis of Invention Disclosures and Companies Founded by Stanford University Faculty from 2000-2014." *Les Nouvelles – Journal of the Licensing Executives Society* 22.1 (2018): pp. 83-90. Web. Apr. 5, 2019. <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3103214](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3103214)>.
- Hosler, L. "Mind the Gap– the USPTO's Efforts to Narrow the Gender Gap in Patenting and Innovation." *Technology and Innovation* 19.4 (2018): pp.759-762. Web. Mar. 1, 2019. <<https://www.ingentaconnect.com/content/nai/ti/2018/00000019/00000004/art00011>>.
- Hunt, J., Garant, J., Herman, H. and Munroe, D. "Why Don't Women Patent?" *nber.org*. National Bureau of Economic Research, Mar. 2012. Web. Mar. 19, 2019. <<https://www.nber.org/papers/w17888>>.

- Hunt, J., Garant, J., Herman, H. and Munroe, D. "Why Are Women Underrepresented Amongst Patentees?" *Research Policy* 42.4 (2013): pp. 831-843. Print.
- INDECOPI. "Practicas para Promover el Uso de la Propiedad Intelectual en las Mujeres Innovadoras." 2018. Provided to the authors by the Government of Peru, Oct. 2019.
- International Finance Corporation. "Voices of Women Entrepreneurs in Tanzania." *ifc.org*. World Bank Group, 2007. Web. Mar. 19, 2019. <<https://www.ifc.org/wps/wcm/connect/5b18c6c2-f4e8-4f96-8b34-d8b0906e62e2/Voices%2Bof%2BWomen%2BEntrepreneurs%2B-%2BTanzania.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-5b18c6c2-f4e8-4f96-8b34-d8b0906e62e2-jqeBF.6>>.
- International Trade Centre. "SheTrades: Promoting SME Competitiveness in Indonesia." *intracen.org*. 2017. Web. Mar. 15, 2019. <[http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/SheTrades%20Women%20Indonesia%20final\\_Low%20res.pdf](http://www.intracen.org/uploadedFiles/intracenorg/Content/Publications/SheTrades%20Women%20Indonesia%20final_Low%20res.pdf)>.
- Jacquemet, N. and Yannelis, C. "Indiscriminate discrimination: A correspondence test from ethnic homophily in the Chicago Labor Market." *Labour Economics* 19.6 (2012): pp. 824-832. Print.
- Jagannathan, M. "Women choose more precise words than men when applying for grant funding, but guess who's more successful?" *marketwatch.com*. Market Watch, May 8, 2019. Web. <<https://www.marketwatch.com/story/how-word-choices-in-grant-proposals-makes-women-less-likely-to-get-funding-2019-05-06>>.
- Jefferson, B. "Gender parity in tech transfer." *source.wustl.edu*. The Source, Jun. 18, 2018. Web. <<https://source.wustl.edu/2018/06/gender-parity-in-tech-transfer/>>.
- Jensen, K., Kovacs, B. and Sorenson, O. "Gender differences in obtaining and maintain patent rights." *Nature Biotechnology*, 36.4 (2018): pp. 307–309. Print.
- Jervis, S. "Why women entrepreneurs are far less likely to be funded." *The Guardian*. The Guardian Group, Aug. 6, 2015. Web. <<https://www.theguardian.com/media-network/2015/aug/06/women-entrepreneurs-venture-capital-funding-tech-startups>>.
- Johnson, H.L. "Pipelines, Pathways, and Institutional Leadership: An Update on the Status of Women in Higher Education (Higher Ed Spotlight)." *acenet.edu*. American Council on Education, Center for Policy Research and Strategy, 2017. Web. <<https://www.acenet.edu/news-room/Documents/Higher-Ed-Spotlight-Pipelines-Pathways-and-Institutional-Leadership-Status-of-Women.pdf>>.
- Kahler, A.I. "Examining Exclusion in Woman-Inventor Patenting: A Comparison of Educational Trends and Patent Data in the Era of Computer Engineer Barbie." *American University Journal of Gender Social Policy and Law* 19.3 (2011): pp. 773-798. Web. Mar. 12, 2019. <<https://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1522&context=jgspl>>

- Kelly, S. "Weaving a Way Forward." *wipo.int*. World Intellectual Property Organization. Web. <[https://www.wipo.int/cooperation/en/funds\\_in\\_trust/japan\\_fitip/taita\\_basket\\_branding.html](https://www.wipo.int/cooperation/en/funds_in_trust/japan_fitip/taita_basket_branding.html)>
- Kerpen, C. "How Women Entrepreneurs Are Closing The Venture Capital Gap." *forbes.com*. Forbes, Apr. 9, 2018. Web. <<https://www.forbes.com/sites/carriekerpen/2018/04/09/how-women-entrepreneurs-are-closing-the-venture-capital-gap/#12b25acf1cf0>>.
- Khan, B. Z. "Married Women's Property Laws and Female Commercial Activity: Evidence from United States Patent Records, 1790-1895." *The Journal of Economic History* 56.2 (1996): pp. 356-388. Web. <<http://www.jstor.org/stable/2123970>>.
- Kirui, D. "How a Trademark Helped Women in Kenya Make a Business from Baskets." *newsdeeply.com*. News Deeply, Apr. 26, 2018. Web. <<https://www.newsdeeply.com/womensadvancement/articles/2018/04/26/how-a-trademark-helped-women-in-kenya-make-a-business-from-baskets>>.
- Korea International Women's Invention Exposition. "Overview." *kiwie.or.kr*. Web. <<http://kiwie.or.kr/newkiwie/eng/exposition/infor.asp>>.
- Korean Intellectual Property Office. "Annual Report 2018." *kipo.go.kr*. Apr. 2019. Web. <[https://www.kipo.go.kr/upload/en/download/annualreport\\_2018.pdf](https://www.kipo.go.kr/upload/en/download/annualreport_2018.pdf)>.
- Laboratoria. "English Home page." *laboratoria.la*. Web. Jul. 31, 2019. <<https://www.laboratoria.la/en>>.
- Lefeuve, B., Raffo, J., Saito, K. and Lax-Martinez, G. "Women and the international patent system: encouraging trends." *wipo.int*. WIPO Magazine. Apr. 2018. Web. Mar. 2, 2019. <[https://www.wipo.int/wipo\\_magazine/en/2018/02/article\\_0008.html](https://www.wipo.int/wipo_magazine/en/2018/02/article_0008.html)>.
- Lotze, K. "10 tech companies with generous parental leave benefits." *techrepublic.com*. Tech Republic, Feb. 15, 2019. Web. <<https://www.techrepublic.com/article/10-tech-companies-with-generous-parental-leave-benefits/>>.
- Madl, A.C. and Ouellette, L.L. "Policy Experiments to Address Gender Gaps Among Innovators." *Houston Law Review* 57.4 (2020): pp. 813-841. Web. <<https://ssrn.com/abstract=3505012>>.
- Marakar, S. "When Women Control the Money, Female Founders Get Funded." *New York Times*. Mar. 1, 2019. Web. <<https://www.nytimes.com/2019/03/01/business/female-founders-venture-capital.html>>.
- Marcowitz-Bitton, M., Kaplan, Y. and Morris, E.M. "Unregistered Patents & Gender Equality." *Harvard Journal of Law & Gender* 43.1 (forthcoming, 2019). Web. <[https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3502178](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3502178)>.
- Martinez, G.L., Raffo, J. and Saito, K. "Economic Research Working Paper No. 33: Identifying the gender of PCT inventors." *wipo.int*. World Intellectual Property Organization, Nov. 2016. Web. Mar. 18, 2019. <[https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_econstat\\_wp\\_33.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_econstat_wp_33.pdf)>.

- McGrane, C. "‘Hidden Figures’ inspires hundreds of girls at special MLK Day Showing." *geekwire.com*. GeekWire, Jan. 16, 2017. Web. <<https://www.geekwire.com/2017/hidden-figures-inspires-hundreds-girls-special-mlk-day-showing/>>.
- McKinsey Global Institute. "The Power of Parity: How Advancing Women’s Equality Can Add \$12 Trillion to Global Growth." *mckinsey.com*. Sep. 1, 2015. Web. <<https://www.mckinsey.com/featured-insights/employment-and-growth/how-advancing-womens-equality-can-add-12-trillion-to-global-growth>>.
- McMillan, G.S. "Gender Differences in Patenting Activity: An Examination of the U.S. Biotechnology Industry." *Scientometrics* 80 (2009): pp. 683-691. Print.
- Mertens, E. "International Women’s Day: IP Counsel Reflect on Gender Challenges and Progress." *managingip.com*. Managing Intellectual Property, Mar. 8, 2019. Web. Mar. 12, 2019. <<https://www.managingip.com/Article/3863249/Managing-Patents-Archive/International-Womens-Day-IP-counsel-reflect-on-gender-challenges-and-progress.html>>.
- Meunier, F., Krylova, Y. and Ramalho, R. "Women’s Entrepreneurship: How to Measure the Gap between New Female and Male Entrepreneurs?" *worldbank.org*. World Bank, Nov. 2017. Web. Mar. 15, 2019. <<http://documents.worldbank.org/curated/en/704231510669093889/pdf/WPS8242.pdf>>.
- Microsoft. "Make What’s Next Home page." *microsoft.com*. Web. <<https://www.microsoft.com/en-us/philanthropies/make-whats-next>>.
- Milli J., Williams-Baron, E., Berlan, M., Xia, J. and Gault, B. "Equity in Innovation: Women Inventors and Patents." *iwpr.org*. Institute for Women’s Policy Research, 2016. Web. Mar. 20, 2019. <<https://iwpr.org/wp-content/uploads/wpallimport/files/iwpr-export/publications/C448%20Equity%20in%20Innovation.pdf>>.
- Milli, J. "The Need to Promote Gender Diversity in Entrepreneurship, Innovation, and Patenting" [Written Testimony to the United States House of Representatives]. *iwpr.org*. Jul. 11, 2018. Web. <[https://iwpr.org/wp-content/uploads/2018/07/Small-Business-Comte\\_Milli-Testimony-7.11.2018.pdf](https://iwpr.org/wp-content/uploads/2018/07/Small-Business-Comte_Milli-Testimony-7.11.2018.pdf)>.
- Moyseyenko, I. "Tax & Business Tips for Women-Owned Businesses." *taxwarriors.com*. Drucker and Scaccetti, Jul. 26, 2017. Web. <<https://www.taxwarriors.com/blog/tax-business-tips-for-women-owned-businesses>>.
- Murray, F. and Graham, L. "Buying Science and Selling Science: Gender Differences in the Market for Commercial Science." *Industrial and Corporate Change* 16.4 (2007): pp. 657-689. Print.
- Naaraayanan, S.L. "Women’s Inheritance Rights and Entrepreneurship Gender Gap" (Working Paper). *editorialexpress.com*. Feb. 2019. Web. <[https://editorialexpress.com/cgi-bin/conference/download.cgi?db\\_name=CICF2019&paper\\_id=645](https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=CICF2019&paper_id=645)>.

Nager, A., Hart, D., Ezell, S. and Atkinson R.D. "The Demographics of Innovation in the United States." *itif.org*. Information Technology and Innovation Foundation, Feb. 2016. Web. Apr. 8, 2019. <<http://www2.itif.org/2016-demographics-of-innovation.pdf>>.

National Union of Students and UK Intellectual Property Office. "Student attitudes towards intellectual property." *nus.org.uk*. 2012. Web. <<http://www.nus.org.uk/PageFiles/12238/IP%20report.pdf>>.

National Women's Business Council. "Intellectual Property and Women Entrepreneurs." Sep. 10, 2012. Web. Mar. 22, 2019. <<https://s3.amazonaws.com/nwbc-prod.sba.fun/wp-content/uploads/2018/02/27192554/Qualitative-Analysis-Intellectual-Property-Women-Entrepreneurs-Part-2.pdf>>.

Organisation for Economic Cooperation and Development. "Gender Equality: Gender Gap in Education." *oecd.org*. Mar. 2016. Web. <<https://www.oecd.org/gender/data/gender-gap-in-education.htm>>.

Organisation for Economic Cooperation and Development. "Empowering Women in the Digital Age: Where Do We Stand?" *oecd.org*. OECD Directorate for Science, Technology and Innovation, 2018. Web. <<https://www.oecd.org/social/empowering-women-in-the-digital-age-brochure.pdf>>.

Organisation for Economic Cooperation and Development/European Union. "Policy Brief on Women's Entrepreneurship." *oecd.org*. 2017. Web. <<https://www.oecd.org/cfe/smes/Policy-Brief-on-Women-s-Entrepreneurship.pdf>>.

Organization For Women In Science For The Developing World. "What is OWSD?" *owsd.net*. Web. Jul. 31, 2019. <<https://owsd.net/about-owsd/what-owsd>>.

Osei-Tutu, J. J. "Using Intellectual Property Law to Promote Human Flourishing for "Market Women"." *americanbar.com*. American Bar Association, 2018. Web. Mar. 14, 2019. <[https://www.americanbar.org/groups/intellectual\\_property\\_law/publications/landslide/2017-18/march-april/using-intellectual-property-law-promote-human-flourishing-market-women/](https://www.americanbar.org/groups/intellectual_property_law/publications/landslide/2017-18/march-april/using-intellectual-property-law-promote-human-flourishing-market-women/)>.

Polaris. "Who we are." *polaris.community*. Web. <<https://polaris.community/about>>.

Possible Woman Foundation International. "Home page." Web. <<http://possiblewomanfoundationinternational.org/>>.

PTI. "Patent application filed by women entrepreneurs to get faster clearance: DIPP proposal." *businesstoday.in*. Business Today, Dec. 17, 2018. Web. Mar. 15, 2019. <<https://www.businesstoday.in/technology/news/patent-application-filed-by-women-entrepreneurs-to-get-faster-clearance-dipp-proposal/story/301366.html>>.

Rasi, N. "The Value of Mentorship." *akilidada.org*. Akili Dada. 2020. Web. <<http://www.akilidada.org/the-value-of-mentorship/>>.

Sammet, K. and Kekelis, L. "Changing the Game for Girls in STEM: Findings on High Impact Programs and System-Building Strategies." *techbridgegirls.org*. Techbridge Girls. Apr. 2016. Web.

<<https://techbridgegirls.org/Changing%20the%20Game%20for%20Girls%20in%20STEM%20White%20Paper%20FINAL%204.8.16.pdf>>

Sexton, K.B. and Ligler, F.S. "Strategies to Close the Gender Gap in Invention and Technology Commercialization." *Technology and Innovation* 19.4 (2018): pp. 701-706. Print.

She Leads Africa. "About Us." *sheleadsafrica.org*. 2016. Web.  
<<https://sheleadsafrica.org/aboutus/>>.

Society of Women Engineers. "Home page." Web. <<https://swe.org/>>.

Sohar, K., Mercier, N., Goble, L., Gahramani, F. and Loftin, B. "Gender Data Gap: Baseline of U.S. Academic Institutions." *Technology & Innovation* 19.4 (2018): pp. 671-683. Print.

Stand for Her Land Campaign. "Home page." Web. Aug. 15, 2019. <<https://stand4herland.org>>.

Stephan P.E. and El-Gainainy, A. "The Entrepreneurial Puzzle: Explaining the Gender Gap." *The Journal of Technology Transfer* 32.5 (2007): pp. 475-487. Print.

Stillman, J. "5 Tips for Fundraising While Female." *inc.com*. Inc., Sep. 29, 2015. Web.  
<<https://www.inc.com/jessica-stillman/5-tips-for-fundraising-while-female.html>>.

SUCCESS Act. "Public Law No: 115-273." *congress.gov*. United States Congress, Oct. 31, 2018. Web. <https://www.congress.gov/bill/115th-congress/house-bill/6758>.

Sugimoto, C.R., Ni, C., West, J. D. and Larivière, V. "The Academic Advantage: Gender Disparities in Patenting." *PLoS ONE* 10.5 (2015). Web.  
<<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0128000>>.

Szychowski, E. and Stembel, C. "Women-owned businesses face a lack of funding – and here's how to change this." *marketwatch.com*. Market Watch, Mar. 8, 2019. Web.  
<<https://www.marketwatch.com/story/women-owned-businesses-face-a-lack-of-funding-and-heres-how-to-change-this-2019-03-08>>.

Techbridge Girls. "Home page." Web. <<https://www.techbridgegirls.org/>>.

The Association for Women in Mathematics. "About the AWM." *awm-math.org*. Web. Aug. 1, 2019. <<https://awm-math.org/about/>>.

United Nations Conference on Trade and Development. "A Survey on Women's Entrepreneurship and Innovation." *unctad.org*. 2013. Web. Mar. 24, 2019.  
<[http://emprettec.unctad.org/wp-content/uploads/2015/01/UNCTAD\\_DIAE\\_ED\\_2013\\_1.pdf](http://emprettec.unctad.org/wp-content/uploads/2015/01/UNCTAD_DIAE_ED_2013_1.pdf)>.

United Kingdom Intellectual Property Office. "Gender profiles in worldwide patenting: An analysis of female inventorship." *gov.uk*. Oct. 2, 2019. Web.  
<<https://www.gov.uk/government/publications/gender-profiles-in-worldwide-patenting-an-analysis-of-female-inventorship-2019-edition>>.



United Kingdom Parliament. "Marriage: property and children." *parliament.uk*. Web. Aug. 15, 2019. <<https://www.parliament.uk/about/living-heritage/transformingsociety/private-lives/relationships/overview/propertychildren/>>.

United Nations Educational, Scientific and Cultural Organization Institute for Statistics. "How Much Does Your Country Invest In R&D?" *uis.unesco.org*. Web. Jul. 5, 2019. <<http://uis.unesco.org/apps/visualisations/research-and-development-spending/>>.

Upcounsel. "Woman Owned Business Tax Benefits: Everything You Need to Know." *upcounsel.com*. 2019. Web. <<https://www.upcounsel.com/woman-owned-business-tax-benefits>>.

United States Agency for International Development. "Gender Equality and Women's Empowerment." *usaid.gov*. 2019. Web. Aug. 15, 2019. <<https://www.usaid.gov/tanzania/our-work/gender-equality-and-women%E2%80%99s-empowerment>>.

United States Patent and Trademark Office. "Girl Scouts IP Patch." *uspto.gov*. Web. <<https://www.uspto.gov/kids/patchFAQ.html>>.

United States Patent and Trademark Office. "Filing a patent application on your own: Pro Se Assistance Program." *uspto.gov*. Web. <<https://www.uspto.gov/patents-getting-started/using-legal-services/pro-se-assistance-program>>.

United States Patent and Trademark Office. "Patent Pro Bono Program for independent investors and small businesses." *uspto.gov*. Web. <<https://www.uspto.gov/patents-getting-started/using-legal-services/pro-bono/patent-pro-bono-program>>.

United States Patent and Trademark Office. "Progress and Potential: A profile of women inventors on U.S. patents." *uspto.gov*. 2019. Web. <<https://www.uspto.gov/sites/default/files/documents/Progress-and-Potential.pdf>>.

Villa, M. "Women own less than 20 per cent of the world's land. It's time to give them equal property rights." *weforum.org*. World Economic Forum, Jan. 11, 2017. Web. <<https://www.weforum.org/agenda/2017/01/women-own-less-than-20-of-the-worlds-land-its-time-to-give-them-equal-property-rights/>>.

Vishnubhakat, S. "Gender Diversity in the Patent Bar." *John Marshall Review of Intellectual Property* 14 (2014): pp. 67-90. Print.

WAAW Foundation. "Scholarships." *waawfoundation.org*. Web. Aug. 1, 2019. <<http://waawfoundation.org/scholarships/>>.

Waruru, M. "Kenya In Drive To Get Artisans, Designers To Embrace IP." *ip-watch.org*. IP Watch, Sep. 13, 2016. Web. <<https://www.ip-watch.org/2016/09/13/kenya-in-drive-to-get-artisans-designers-to-embrace-ip/>>.

White & Case. "Closing the credit gap for female entrepreneurs." *whitecase.com*. Nov. 20, 2017. Web. Mar. 14, 2019. <<https://www.whitecase.com/publications/article/closing-credit-gap-women-entrepreneurs>>.

- Whittington, K.B. and Smith-Doerr, L. "Gender and Commercial Science: Women's Patenting in the Life Sciences." *The Journal of Technology Transfer* 30.4 (2005): pp. 355-370. Print.
- Whittington K. and Smith-Doren L. "Women inventors in context: disparities in patenting across academia and industry." *Gender & Society* 22.2 (2008): pp. 194–218. Print.
- Williams-Baron, E., Milli J. and Gault, B. "Innovation and Intellectual Property among Women Entrepreneurs." *iwpr.org*. Institute for Women's Policy Research, Sep. 6, 2018. Web. Mar. 20, 2019. <[https://iwpr.org/wp-content/uploads/2018/07/C472\\_Report-Innovation-and-Entrepreneurship-9.6.18-clean.pdf](https://iwpr.org/wp-content/uploads/2018/07/C472_Report-Innovation-and-Entrepreneurship-9.6.18-clean.pdf)>.
- WIPO Academy. "Home page." *wipo.int*. Web. <<https://www.wipo.int/academy/en/>>.
- Womana. "About Us." *womana.com*. Web. <<https://womana.com/about-us/>>.
- Women in Technology International. "About WITI." *witi.com*. Web. <<https://www.witi.com/about/>>.
- Women's Funding Alliance. "Grants." *wfalliance.org*. Web. <<https://wfalliance.org/about/grants/>>.
- Women's Funding Network. "Home page." Web. Jul. 31, 2019. <<https://www.womensfundingnetwork.org/>>.
- World Bank. "Expanding Women's Access to Financial Services." *worldbank.org*. Feb. 26, 2014. Web. <<https://www.worldbank.org/en/results/2013/04/01/banking-on-women-extending-womens-access-to-financial-services>>.
- World Bank. "Women, Business, and the Law Factsheet 2018." *worldbank.org*. World Bank Group, 2018. Web. <<http://pubdocs.worldbank.org/en/794041522241147529/WBL-factsheet-using-property-FINAL-PDF.pdf>>.
- World Intellectual Property Organization. "Leading the Way for Inventive Women in Korea And Beyond." *wipo.int*. Jul. 29, 2016. Web. <[https://www.wipo.int/women-and-ip/en/news/2016/news\\_0005.html](https://www.wipo.int/women-and-ip/en/news/2016/news_0005.html)>.
- World Intellectual Property Organization. "'Women and IP' agenda item" (extract from minutes of the Committee meeting). Twenty-second Session of the Committee on Development and Intellectual Property, 2018.
- World Intellectual Property Organization. "Patent Cooperation Treaty Yearly Review 2019." *wipo.int*. 2019. Web. <[https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_901\\_2019.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2019.pdf)>.
- World Trade Organization. "Agenda Item 11: Intellectual Property and Innovation: Women and Innovation" (extract from minutes of meeting of the Council for Trade-Related Aspects of Intellectual Property Rights). 2015. Web. Mar. 12, 2019. <[https://www.wto.org/english/tratop\\_e/trips\\_e/08\\_ip\\_and\\_innovation\\_women\\_and\\_innovation\\_78a1.pdf](https://www.wto.org/english/tratop_e/trips_e/08_ip_and_innovation_women_and_innovation_78a1.pdf)>.