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# Eligible Patent Matter—Gender Analysis of Patent Law: International and Comparative Perspectives

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# ELIGIBLE PATENT MATTER—GENDER ANALYSIS OF PATENT LAW: INTERNATIONAL AND COMPARATIVE PERSPECTIVES

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## I. INTRODUCTION

### *A. The Differences Between Genders: A New Outlook*

Several years ago, in an attempt to explain the quantitative gap that exists between men and women on university science faculties, Professor Lawrence Summers proclaimed that there are fewer women than men on science and math faculties because men and women have different abilities in these fields.[1] A month later, addressing his comments on women and the sciences, Summers added that the absence of women in scientific fields arises from present social failings that ought to be corrected.[2]

Summers's explanation of the alleged innate differences between men and women reflects the prevailing opinion on the absence of women in scientific fields and the deficit of women inventors.[3] The widely held contention posits that there are inborn biological differences between men and women; women possess more advanced verbal skills and men possess better mathematical and spatial capabilities (known as the difference claim).[4]

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1. *See* Suzanne Goldenberg, *Why Women Are Poor at Science, by Harvard President*, THE GUARDIAN (London) (Jan. 18, 2005, 12:14 PM), http://www.guardian.co.uk/science/2005/jan/18/educationsgendergap.genderissues (reporting that Professor Summers intended to stimulate discussion at a conference when he stated that innate differences between men and women might be one reason that fewer women succeed in science and math careers, and offered three explanations for the lack of women in senior positions in science and engineering: (i) a lack of desire to work long hours because of their responsibilities for their children; (ii) innate differences between males and females; and (iii) the influence of gender discrimination on academic appointments); *see also* Lawrence H. Summers, *Letter from President Summers on Women and Science*, HARVARD UNIV. OFFICE OF THE PRESIDENT (Jan. 19, 2005), http://www.president.harvard.edu/speeches/summers_2005/womensci.php (apologizing for not having weighed his comments more carefully after receiving negative media responses to his comments).

2. *See* Lawrence H. Summers, *Remarks at NBER Conference on Diversifying the Science & Engineering Workforce*, HARVARD UNIV. OFFICE OF THE PRESIDENT (Jan. 14, 2005), http://www.president.harvard.edu/speeches/summers_2005/nber.php (explaining that discrimination and the lack of education are responsible for the scarcity of women working in science).

3. *See* Steven Pinker, *The Science of Difference*, THE NEW REPUBLIC ONLINE (Feb. 14, 2005), http://pinker.wjh.harvard.edu/articles/media/2005_02_14_newrepublic.html (stating that Summers's analysis of why there are fewer women in the sciences is commonplace amongst economists who study gender disparities).

4. *See* Doreen Kimura, *Sex Differences in the Brain*, SCI. AM. (May 13, 2002), *available at* http://www.changelingaspects.com/Articles/Sex Differences in the Brain - Scientific American.htm (adding that recent empirical studies suggest that the effects of sex hormones on brain organization occur so early in life that evaluating the effect of experience and enjoyment is even more difficult than previously understood); *see also* ELEANOR E. MACCOBY & CAROL N. JACKLIN, THE PSYCHOLOGY OF SEX DIFFERENCES

According to this contention, people would expect only a small minority of women to be inventors; thus, the segregation between women and men in the field of technological-industrial invention is neither coincidental nor the intentional result of a particular legal structure, but instead the natural consequence of such alleged innate differences. Research examining the differences between men and women, reported in psychological literature, supports this opinion.[5] Incorporated into this widely held contention is the assumption that even if legal structures facilitated or encouraged women to own patents, women would remain the minority patent-holders because of their innate differences. Adoption of this explanation precludes any reason or incentive to change the social and legal structures for acquiring patents in a way that would grant women more rights because, under the difference claim, the result would inextricably remain the same.

The discussion contained in this Article does not deal with the accuracy of the biological claim that asserts the existence of "differences" between genders. Rather, the focus is to bring attention to and open channels of discourse regarding the state of gender inequality within the patent field by analyzing the approaches of various feminist theories to the "differences" between the genders. It will also demonstrate how the current legal mechanisms, as applied in practice, use these differences to maintain the status quo and restrict women from becoming "inventors."[6]

In this introductory section, two general feminist approaches to the claim of gender differences set the stage for a later discussion of the intersection between gender and patent law. This discussion is followed by a summary of the contents of the study embodied in this Article, the current findings of related research, and the significance of such findings.

In contrast to Professor Summers's viewpoint, Radical Feminism, the first of the gender theories discussed, does not accept the paradigm of gender "differences," claiming it is a suppressive explanation meant to infuse the world with security and certainty regarding the status quo of tradi-

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351-52 (1974) (listing numerous areas where there has been insufficient empirical research or ambiguous findings comparing men and women such as studies assessing competitiveness, dominance, compliance, and fear timidity and anxiety in children); LEONARD SAX, WHY GENDER MATTERS: WHAT PARENTS AND TEACHERS NEED TO KNOW ABOUT THE EMERGING SCIENCE OF SEX DIFFERENCES 77-114 (2005) (finding that there are biological differences in the ways boys and girls learn and that separate groups make different learning styles possible).

5. *See* DAVID WECHSLER, THE MEASUREMENT AND APPRAISAL OF ADULT INTELLIGENCE 148 (4th ed. 1958) (explaining that males do better than females in arithmetic and picture completions and females do better than males in vocabulary on intelligence tests).

6. *See* CATHARINE A. MACKINNON, *Difference and Dominance: On Sex Discrimination* (1984), *in* FEMINISM UNMODIFIED 32, 35 (1987) [hereinafter MACKINNON, *Difference and Dominance*] (arguing that law of sex discrimination actually asks to hold women to a male standard, thus defeating its purpose of treating women as equals).

tional gender roles.[7] Because the differences claim is premised upon natural-inborn characteristics, it precludes criticism and change of the status quo.[8]

Professor Catherine MacKinnon emphasizes that the relevant question is not about the "differences" between the sexes, but rather the "distribution of power" in accordance to those alleged differences.[9] Following the distributive reasoning, the current practice of determining the criteria of Eligible Patent Matters (EPM), which determines what is considered a protected patent, is, as this Article claims, in accordance with androcentric characteristics, and is therefore neither biological nor evolutionary, but purely political and consequently serves to influence the unequal distribution of rights and resources in society.[10] As such, while the actual existence of real differences between men and women remains unknown, the fact remains that the female voice is silenced, regardless of whether it is by actual innate differences or imagined ones.[11] If genuine female traits exist, they can only be expressed where there is no fear under conditions of freedom, autonomy, and equality, conditions that fail to exist today. At that point, it will be possible to examine the laws of invention in a more egalitarian manner. Until then, according to Radical Feminist theory, the widespread perspective of "gender as difference" merely utilizes gender as an exclusory mechanism stunting the growth of women in general and, for the purposes of this discussion, as inventors. When acknowledging such circumstances, the relevant and practical question then becomes, how can women gain access to those benefits from which they were excluded?

On the other hand, cultural feminism accepts the contention that there are differences between the sexes, and it praises women's differences.[12]

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7. *See* CATHARINE A. MACKINNON, *Not by Law Alone: From a Debate with Phyllis Schlafly, in* FEMINISM UNMODIFIED 21, 22 (1987) [hereinafter MACKINNON, *Not by Law Alone*] (arguing that differentiation is a strategy to suppress women, while real feminism seeks to empower women on their own terms).

8. *See* CATHARINE A. MACKINNON, TOWARD A FEMINIST THEORY OF THE STATE 249 (1989) [hereinafter MACKINNON, TOWARD A FEMINIST THEORY] (finding that most people have a natural tendency to find the logic for existing "rules" and to justify them, which creates a sense of certainty and reduces the anxiety of the unknown but also paralyzes criticism and change).

9. *See* MACKINNON, *Difference and Dominance*, *supra* note 6, at 34 (arguing that difference between men and women created their division but men dominated to the point where women are measured according to their lack of correspondence with men).

10. *See* Catharine A. MacKinnon, *Feminism, Marxism, Method, and the State: Toward Feminist Jurisprudence*, 8 SIGNS: J. WOMEN CULTURE & SOC'Y 635, 638-39 (1983) (claiming that male dominance is the most pervasive power in history because its point of view is the standard).

11. *See* MACKINNON, *Difference and Dominance*, *supra* note 6, at 44-45 (arguing that as long as women's voices are not heard and sex equality is limited by sex difference, women cannot achieve true equality).

12. *See* CAROL GILLIGAN, IN A DIFFERENT VOICE: PSYCHOLOGICAL THEORY AND WOMAN'S DEVELOPMENT 6 (1982) (arguing that to understand human development, we

Professor Carol Gilligan describes some of those differences, including traditionally—attributed "female" traits that emphasize support for relationships and traditionally—attributed "male" traits that emphasize hierarchy and power. The differences attributed to women, according to Gilligan's claim, are neither objective nor neutral because, when viewed critically, general rules, standards and norms emerge as measures created and calculated according to male traits.[13] Any differences possessed by women, therefore, automatically became exceptions to the norm and being an exception or different has, over time, acquired the meaning of inferiority. The result is that "male" traits act as discriminative tools disguised as legitimate criteria used to exclude women from receiving the same benefits as the standard (male).[14]

Both feminist approaches agree that questioning the differences between the genders (especially the claim of biological origins) is not necessary to the gender bias analysis. Gender difference perpetuates the inferiority of women, excludes women from rights, capital, resources and power sources, and prevents reform by releasing institutions (and individuals) of any social and legal responsibility.

As applied today, the differences between the genders serve only as foundational criteria for a discriminatory definition in the context of defining the benefits and protections of patent law and for distributing those benefits between the genders. As a result of the way that the difference claim is used, rather than the difference itself, the definitions of "invention" and "inventor" exclude women from the entitled group of inventors.[15] It is legal mechanisms of this type that are considered and analyzed in this Article

Recognition of this exclusionary mechanism is important because it is the first step to taking corrective action. Just as the claim of difference is used to exclude women, legal mechanisms can also be used to change the resultant discrimination and grant women access to rights and benefits. One way to accomplish this can be through expanding relevant definitions to entitle more individuals to patent rights, as explained below.

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must take into account the female experience).

13. *See id*. at 5-6 (finding that theories formerly seen as neutral actually reflect many biases because people are accustomed to seeing life through men's eyes).

14. *See id.* at 5 (pointing out that theorists have made the male life the norm and women are fashioned out of male cloth).

15. *See* 35 U.S.C. §§ 113-15 (2006) (requiring a drawing, detailed description, model if necessary, and oath that inventor "believes *himself* is original and first inventor of the process, machine, manufacture, or composition of matter, or improvement thereof" (emphasis added)).

### *B. Gender Analysis of Patent Law: A New Approach*

This Article proposes a novel gender analysis of patent law. Until now, the literature on gender differences and behavioral approaches to science has been limited, relating mainly to explaining the gap between men and women in acquiring patents from a sociological perspective. The existing body of literature discusses the tendency of women to favor less competitive environments and build more collaborative networks.[16] Some scholars have assessed gender differences in studies comparing men's and women's achievement patenting in science and found that females are less likely to patent.[17] The question that remains is: "why?" This question of "why?" is discussed in depth and from a new perspective for the first time below.

The study embodied in this Article relates to the laws of patents. At first glance, it would seem that intellectual property laws are objective and gender-neutral. Unlike other areas of the law that deal with gender inequality directly (such as family law or maternity laws), intellectual property laws, including the laws relating to patenting inventions, do not, on their face, seem to relate to gender. The legal rules themselves mention neither women nor men. Instead, the exclusion of women from these laws is concealed and has yet to be the subject of focused discussion. Superficially, any woman can invent any invention, register a patent, and earn royalties in a manner equal to that of a man in accordance with the law. The reality, however, remains quite different. Gilligan wrote that "active adventure is a male activity, and that if a woman is to embark on such endeavors, she must at least dress like a man."[18] The basic premise of the discussion in this Article is that the law, including patent law, is neither neutral nor objective.[19] It should be noted that this criticism of subjectivity is not the sole

16. *See* Yu Meng, *Women in Patenting: Does Nanotechnology Make a Difference?*, DRUID-DIME ACAD. 5 (Jan. 2010), *available at* http://www2.druid.dk/conferences/viewpaper.php?id=500602&cf=44 (discussing that because of these attributes women might be more attracted to entering an interdisciplinary field).

17. *See, e.g.*, *id.* at 17 (calling for scholarly intervention to close the gap in gender discrimination in the sciences); Waverly W. Ding et al., *Gender Differences in Patenting in the Academic Life Science*, 313 SCIENCE 665, 665-67 (2006) (finding that women faculty members patent at about a rate 40% of the rate of men but that there might not be a measurable gender difference to answer why); Ranier Frietsch et al., *Gender-Specific Patterns in Patenting and Publishing*, 38 RES. POL'Y, 590, 594-95 (2009) (finding that while there has been a strong increase in women's contribution to tecnological output in Spain, France, Denmark, Australia, and the U.S., women's contributions are still relatively low compared to men, explaining that the availability of entering a specific field in those countries plays a significant role).

18. GILLIGAN, *supra* note 12, at 13.

19. *See generally* DUNCAN KENNEDY, A CRITIQUE OF ADJUDICATION 133-212 (1997) (discussing the principle of neutrality); GEORGE SHER, BEYOND NEUTRALITY: PERFECTIONISM AND POLITICS 20-175 (1997) (evaluating the idea of complete government neutrality and arguing that instead of neutrality the government should promote a certain idea of "good"); Owen M. Fiss, *Objectivity and Interpretation*, 34 STAN. L. REV. 739, 744 (1982) (claiming that objectivity recognizes a role for the subjective).

property of feminists: it is a logical and critical schema that has been used in the past by other critical legal studies.[20] Feminism is one part of this skeptical tradition, although it does include its own criticisms of the law.[21] In this instance, feminist theoreticians stress the claim that the legal principles in place can lead to discrimination against women by both creating and perpetuating gender gaps.[22]

Accordingly, the law of invention is neither objective nor neutral but contains a built-in gender bias. This research is premised upon the notion that a legal analysis, based on a feminist perspective, will contribute to understanding the phenomenon of women's exclusion from owning intellectual property rights in inventions and patents. The research addresses Professor Wright's statement: "Intellectual property generally is one of the few areas of law that seems to have escaped feminist analysis."[23]

The reader should note that, although understanding the legal issues is fundamental to comprehension of the processes that excludes women from inventing, a holistic understanding of the phenomena also includes consideration of social and legal factors. While this Article focuses on one aspect of gender discrimination in the context of patent law, the paucity of women among the owners of intellectual property rights in inventions and patents is complex and should be analyzed from various perspectives. A proper analysis also requires a discussion of both the statistics regarding the number of women inventors and the problems that arise from the encounter between women and the workplace. Each of these discussions has been explored in separate articles.[24]

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20. *See* Owen M. Fiss, *What is Feminism?*, 18 TEL AVIV U. L. REV. 5, 14 (1993) (describing that objectivity in the law is a product of the public's "false consciousness" and serves as a tool for the continued control of the oppressed, making rights the property of one group, while denying them to another; and describing the critical legal studies (CLS) movement that developed in the late 1970s, which applied this critical paradigm to free-market theory and legal principles in general).

21. *See* MACKINNON, *Not by Law Alone*, *supra* note 7, at 26 (arguing the law as written has helped women progress very little because it has been a male sphere); MACKINNON, TOWARD A FEMINIST THEORY, *supra* note 8, at 161-62 (stating that the law sees and treats women the way men see and treat women).

22. *See generally* Christine A. Littleton, *Reconstructing Sexual Equality*, 75 CALIF. L. REV. 1279 (1977) (arguing that the differences between males and females are real and significant, and that society needs to revalue traditional female occupations as equivalent to "male" activities); Joanne Conaghan, *Tort Law And Feminist Critique*, *in* CURRENT LEGAL PROBLEMS 2003 175 (M.D.A. Freeman ed., vol. 56, 2003) (disagreeing with comments made by Professor Gary Schwartz, and arguing that feminist scholarship in the area of torts is not thin in substance and narrow in scope, but is richer and deeper than first impression).

23. *See* Shelley Wright, *A Feminist Exploration of the Legal Protection of Art*, 7 CAN. J. WOMEN & L. 59, 64 (1994) (calling for additional research on the presence and absence of women within legal protective contexts, particularly in the patent field).

24. *See* Shlomit Yanisky-Ravid, *Exclusion of Women Inventors from the Meeting Point Between Patents as Intellectual Property, Work and Feminine Discourse*, *in* STUDIES IN LAW, GENDER AND FEMINISM 357 (Daphne Barak-Erez et al. eds., 2007)

This Article analyzes the legal structures of patent law and is built upon the notion that the other, extra-legal explanations alone are insufficient and unable to provide the whole explanation for the exclusion of women inventors. This Article, for the first time, analyzes the U.S. Supreme Court's and the international interpretation of the definition of EPM, from the gender perspective. This Article concludes that where the definition of EPM is narrow, it does not include "women's life experiences" and, therefore, acts to exclude women from receiving patents.

## II. EXCLUSION OF WOMEN INVENTORS BY THE NARROW DEFINITION OF A PATENTABLE INVENTION

### *A. Eligible Patent Matter (EPM) as a Filtering Factor*

Intellectual property laws provide important sources of access to concrete and intellectual assets, capital, rights and power.[25] Recognition of the continued and increasing contribution of intellectual property to innovation is well established. Patent ownership plays an important role acting as an incentive for advancement that inevitably leads to economic growth. As such, the number of patent applications and grants has grown significantly over recent years, as has the type and breadth of inventions that can be patented.[26]

The laws of intellectual property make it possible for applicants and other people who have access to the patent system to benefit from basic, existential values including liberty, autonomy, and security while developing and actualizing their personhood.[27] From this point of departure, it is no

(explaining the obstacles preventing entry to positions that might, in the long run, lead to developing patents, and the structural conflict between motherhood and work that attribute to the low number of woman inventors who own intellectual property in their inventions).

25. *See* Jeanne L. Schroeder, *Chix Nix Bundle-O-Stix: A Feminist Critique of the Disaggregation of Property*, 93 MICH. L. REV 239, 257-58 (1994) (defining property rights as a system of rules that control access to scarce resources which have the ability to satisfy human needs and desires.); Joshua D. Sarnoff, *Shaking the Foundations of Patentable Subject Matter, Preliminary Discussion Draft*, PROGRAM ON INFO. JUSTICE AND INTELLECTUAL PROP. 2 (Apr. 2, 2008), *available at* http://www.wcl.american.edu/pijip/download.cfm?downloadfile=2E900771-B742-DD30-1B56F85D889A053E&typename=dmFile&fieldname=filename (arguing the restriction of some male-dominated inventions, including mathematical algorithms, products of nature, and mental processes, impedes the process of technology).

26. *See, e.g.*, Wendy H. Schacht, *Patent Reform: Issues in the Biomedical and Software Industries*, 27 BIOTECHNOLOGY L. REP., 153, 153 (2007) (stating that these results show the importance of intellectual property to U.S. innovation and have led to Congress's interest in reforming the existing system).

27. *See* Adam Mossoff, *What is Property? Putting the Pieces Back Together*, 45 ARIZ. L. REV. 371, 372-73 (2003) (noting that even the definition of property rights is controversial, and presenting a historical survey of the various definitions given for property).

wonder that the laws of property and intellectual property have served as the focal point of a philosophical-legal-social debate. However, intellectual property laws have not yet been subject to major feminist analysis. When viewed within the context of gender, the reality reveals that women scientists are less productive than men scientists. This has a significant and negative impact on women's career advancement by creating and perpetuating inequalities in the relevant fields, such as reward and cognition.

This Article emphasizes the claim that patent law does not provide protection for all products and processes equally, but only for those products or processes that the law itself defines as worthy of protection (resulting in the exclusion of women). In other words, there are built-in legal filters in patent law. One of these accepted "filters" in the field is the principle of EPM. According to this principle, a patentable invention is one that complies with certain criteria, which are established by the law. *Inter alia*, these include the requirement that the invention be "new and useful."[28]

The first argument, described below, illuminates the phenomenon of how the use of the narrow definition of a patentable invention acts to exclude women. A comparison is made between the narrow definition of an "invention" that is prevalent in international treaties and the long-standing broader U.S. approach.

Until recently, it was possible to identify at least two principal legal approaches to defining an invention: (i) the narrow definition, and (ii) the broad definition. The narrow approach is found in the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS)[29] and has been adopted by many countries, such as Israel.[30] This definition includes technological and industrial aspects as threshold conditions for recognizing an invention as patentable. As explained below, this definition, in actual practice, excludes women as a result of its focus on industrial and technological matters.

28. *See* 35 U.S.C. § 101 (2006) (allowing those who invent or discover any new and useful process, machine, manufacture, composition of matter, or improvement to obtain a patent after meeting the requirements in this title).

29. *Part II – Standards Concerning the Availability, Scope and Use of Intellectual property Rights*, WORLD TRADE ORG., http://www.wto.org/english/tratop_e/trips_e/t_agm3_e.htm (last visited Oct. 20, 2010).

30. *See* Patent Law, 5727-1967 (Isr.) (defining an invention under Israeli law); Singapore Patent Act of 1994, Chap. 221, §13 (1) (1995) (defining an invention as something that "[i]s capable of industrial application"); TAIWAN PATENT LAW, Art. 21 (2003) (defining an invention as a highly creative technical innovation and the grant of the patent for an invention depends whether it "advances technology significantly beyond the state of art at the time of filing"); Japan Patent Law 121, Art. 2(1) (1999) (Japan) (including a reference to the technical application of ideas and defining an invention as "the highly advanced creation of technical ideas by which a law of nature is utilized"). *See generally* WORLD INTELLECTUAL PROPERTY RIGHTS AND REMEDIES (Dennis Campbell ed., 2009) [hereinafter WORLD IP RIGHTS] (comparing different patent law legislations from around the world).

The broad approach is best illustrated by U.S. patent law and its traditional interpretation of patentable matter, which is not limited by technological or industrial requirements, and includes a wider range of inventions. The definition adopted by U.S. law is broader than the TRIPS agreement definition and, therefore, more accepting of the varied occupations of women and their creations.

Recently, however, and to the detriment of women in the sciences, this approach was challenged by U.S. courts on varying levels. The Supreme Court, however, in a traditionalist form, most recently rejected the trend of moving lower level U.S. courts toward a narrower approach.[31] This narrowing trend can be seen, for example, in In re *Bilski* by the U.S. Court of Appeals for the Federal Circuit, which will be discussed below.[32] The recent struggle in U.S. courts to abandon the broader approach and adopt the narrowing trend is a matter of concern. As the definition of EPM increases its focus on products or processes that contain only mechanical, technical and industrial aspects, it becomes more likely that the definition serves to exclude women from becoming inventors. Therefore, these courts' decisions need to be addressed from a gender perspective.

### *B. The Narrow Approach: The Technological Definition of Invention in the TRIPS Agreement*

The most significant international treaties relating to patents have adopted the narrow definition of what is a patentable invention, "patents shall be available for any inventions, whether products or processes, *in all fields of technology*, provided that they are new, involve an inventive step and are capable of *industrial* application."[33]

This definition as it appears in the TRIPS treaty is not atypical or isolated. For instance, the European Patent Convention (EPC) also takes the industrial approach in defining what constitutes an invention: "European patents shall be granted for any inventions which are susceptible of industrial application."[34]

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31. *See* Bilski v. Kappos, 130 S. Ct. 3218, 3231 (2010) (holding that the Bilski Business Methods patent was rejected because of the unpatentability of abstract ideas precedents).

32. *See In re* Bilski, 545 F.3d 943, 966 (Fed. Cir. 2008) (ruling that the Bilski Business Methods patent was properly rejected using the machine or transfer test provided by the Supreme Court and clarified by the Federal Circuit Court of Appeals).

33. *See* WORLD IP RIGHTS, *supra* note 30 (emphasis added) (noting that while TRIPS, section 27 prohibits discrimination, the prohibition focuses on the place of invention, not the gender of the inventor).

34. European Patent Convention, art. 52(1), *opened for signature* Oct. 5 1973 (entered into force Oct. 7, 1977), *available at* http://www.european-patent-office.org/legal/epc/e/ma1.html#CVN (precluding from the definition of invention; aesthetic creations, discoveries, scientific theories, mathematical methods, playing games or doing business, computer programs and methods for treating humans and animals).

These structures and treaties of international intellectual property law are centralized and the wording used in international treaties is then translated literally into the amended legislation of the various signatory countries. As a consequence, countries that utilize the TRIPS definition adopted similar definitions that require a technological application as a prior condition for registering a patent and for receiving the protection of patent laws.[35]

The technological character of an invention has therefore become a central element in the question: what is a patentable invention? As one could attest, "[p]atent law is technology-neutral in theory," but, when taking a deeper view – "it is technology-specific in application."[36]

Intellectual property rights, in general, and patent law in particular, are justified primarily on the foundation of a utilitarian rationale that is expressed in the U.S. Constitution.[37] According to this rationale, in order to encourage progress in fields that are important to humanity, a social contract is entered into between the public and the inventor. In this transaction, exclusive rights are granted, for a limited period, to whoever enriches the world with innovative intellectual products (or is likely to move the process forward).[38] Intellectual property laws are intended to act as an incentive factor for inventors to continue to enrich humanity with new and important intellectual products.

In this respect, many questions may arise regarding the consensus surrounding advancing science in general, and technology and industry in particular.[39] Consider these questions: What is science? Who defines science?

35. *See* Patent Law, 5727-1967 (Isrl.) (defining a patentable product as a "product or a process, which is new and useful, can be used in industry or agriculture" and includes an inventive step which was defined as "a step which does not, to an average skilled person, appear obvious in the light of information published before the application date.").

36. *See* Dan L. Burk & Mark A. Lemley, *Is Patent Law Technology-Specific?*, 17 BERKELEY TECH. L.J. 1155, 1156, (2002) (explaining that the standards were designed to be broad in order to better be able to adapt flexibly to new technologies, and encompass "anything under the sun made by man").

37. *See* U.S. CONST. art. I, § 8 ("To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.").

38. *See* Burk & Lemley, *supra* note 36, at 1156 (explaining that while the rules were designed at a time when inventions were all mechanical, the Federal Circuit has applied those rules in a way that has effectively created different standards for different industries); *see also* William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 J. LEGAL. STUD. 325, 344-51 (1989) (describing the nature and scope of copyright protections); William M. Landes & Richard A. Posner, *Indefinitely Renewable Copyright*, 70 U. CHI. L. REV. 471, 495 (2003) (distinguishing expressive works, and the marketing thereof analogizing to a record company who is protected by copyright laws for all its productions and hence enabled to earn enough money to balance the risk of developing new, potentially unsuccessful, records and reaping the benefits of the successful records).

39. *See* Burk & Lemley, *supra* note 36, at 1156 (arguing that a divergence has become apparent between patent rules and their application to different industries).

What fields are considered part of the definition of science (for instance, is social science included)? What are the results of this definition? Are technology and industry the only fields or the primary fields that enhance human welfare? Who gains from directing the benefits derived from patent law to these particular fields? Who is excluded by this definition? Isn't the contribution of the excluded parties no less significant and important? Would the contribution be made without the patent mechanism that provides monopolistic property rights?

The discussion below, however, does not focus on the question of whether the aim of promoting science, industry and technological advancement are worthy, but rather, on its gender implication, whether the criteria are androcentric and whether the elements of the definition lead to a discriminatory outcome, thereby illegitimatizing the criteria.[40] From the perspective of gender, this narrowed definition of a patentable invention reflects a "masculine model." The definition promotes and perpetuates characteristics that are attributed primarily to "male" products neither considering nor legitimatizing the other, differing, "female voice."

Scholars attribute women's marginalization and exclusion to the ongoing dominating masculine epistemology in modern science, and argue that science could benefit from integrating women as well as their differing holistic and contextual methodologies.[41] Some scholars, however, attempt to attribute this phenomenon to the influence of stereotypes about capabilities and human capital or to gender-related preferences and attitudes towards competition. Indeed, these theories imply that women prefer newly "uncrowed" or "feminine" niches (where women are concentrated) over, fields traditionally dominated by men. Compared to their male colleagues, women scientists are thus concentrated in fewer fields, and their inventions are limited to these fields.[42]

Moreover, an additional hurdle exists making it even more difficult for those (female) inventors to succeed in fields other than technology and in-

40. *See* Mark Kelman, *Market Discrimination and Groups*, 53 STAN. L. REV. 833, 835 (2000) (claiming that overcoming "simple discrimination" is a meta-value and, therefore, a principle that is important to keep without considering cost or balancing various solutions).

41. *See* Meng, *supra* note 16, at 3, 5 (noting that women gain only forty percent of patents that their male counterparts do and women's research approach is inherently comprehensive).

42. *See id*. (arguing that traditional disciplines rigidly adhere to the problems and methods defined by male authorities); *see also* Diana Rhoten & Stephanie Pfirman, *Women in Interdisciplinary Science: Exploring Preferences and Consequences*, 36 RESEARCH POLICY 56, 59 (2007) (analyzing theories explaining why women are more drawn to interdisciplinary research than their male counterparts); Elizabeth Bird, *Disciplining the Interdisciplinary: Radicalism and the Academic Curriculum*, 32 BRIT. J. SOC. EDUC. 463, 464 (2001) (describing the role and growth of women's participation in interdisciplinary studies and noting its steady decline and commenting that women may no longer be the minority in colleges and universities).

dustry. The burden of proving that inventions in fields other than technology and industry comply with the legal definition of an invention lies on the inventor, and in such "alternative" fields, this proof is neither assured nor simple.

Considering the above, it appears that, according to the international definition, the law regarding patents is intended to facilitate inventions of a technological or industrial nature and offer them better protection over other inventions. By adding the technological requirement as a condition for approving a patent, when it is well-known that there are huge gaps between men and women in these fields and without paying proper attention to the inevitable outcomes of enforcing this definition—the flagrant exclusion of women inventors—the definition of EPM becomes clearly problematic in the field of gender relations.

### *C. The Expansive Approach in the U.S. Law: New and Useful Process vs. Machine Test*

The United States, in contrast to the widely held international approach, has explicitly opposed the definition set forth in TRIPS and has historically insisted instead on a broader approach in law.[43] This approach, in place today, supports a broad definition of the EPM and is anchored in both law and precedent.[44]

> 35 U.S.C. 101 Inventions patentable.
>
> Whoever invents or discovers *any new and useful process machine, manufacture, or composition of matter*, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.[45]

A plain text reading reveals that the definition of "inventions patentable" includes neither "*in all fields of technology*" nor "*industrial* applications" as a threshold criteria.[46]

The language of the law reflects an attitude that emerged from the U.S. Constitution, which states that the exclusive protection granted to inventors is intended, "to promote the progress of science and useful arts:"

> U.S. Constitution, Art I § 8:
>
> To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respec-

43. *See* Vincent Chiappetta, *TRIP-ping Over Business Method Patents*, 37 VAND. J.TRANSNAT'L L. 181, 182 (2004) (noting that the United States has been expanding its definition of patents and has added business methods to its patentable inventions definition).

44. Bilski v. Kappos, 130 S. Ct. 3218 (2010).

45. 35 U.S.C. § 101 (2006) (emphasis added).

46. *See* Chiappetta, *supra* note 43, at 184 (arguing the additions to the areas covered under patentable inventions is imprecise and subject to heated debate).

tive writings and discoveries.[47]

The constitution does not claim that "science and useful arts" must have a technological or industrial aspect. Promoting human welfare and progress can instead find expression in broader areas, including the less technical areas of education and business.

The crowning glory of broadly defining inventions has been the U.S. courts' recognition of patent protection for "Business Methods."[48] These broad encompassing rulings have resulted in a substantial expansion of the U.S. patent system and a lessening of its self-limitation to the technical applications only.

It should be stressed that this broad interpretation of the law in the United States, even if not intended to improve the number of women inventors and despite being subject to criticism,[49] inadvertently may serve to contribute to increasing the number of women inventors and may be moving toward the important goal of narrowing the gender gap in patent law. This will be especially true if the definition is expanded to include other equality-promoting interpretations, as proposed below, like endorsing female life experience products and methods as patentable.

In this way, U.S. law is distinguished by its broad and flexible interpretation of what is considered EPM, like its less conspicuous emphasis on the technology and the absence of a list of social exceptions.[50] By embracing a broader definition, the U.S. legal system affords greater protection to the female life experience, avoids limiting protection to only male inventions, and results in an increased number of women inventors.

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47. U.S. CONST. art. I, § 8.

48. *See Bilski*, 130 S. Ct. at 3228-29 (2010) (rejecting the Bilski Business Methods application as unpatentabile because it was an abstract idea and emphasizing, once again, the adoption of the broad approach by stating that the statute acknowledges that there may be a business methods patent); *see also* State Street Bank & Trust Co. v. Signature Fin. Grp., Inc., 149 F.3d 1368, 1373 (Fed. Cir. 1998) (discussing the recognition of Business Methods as patentable).

49. *See generally* Rochelle Cooper Dreyfuss, *Are Business Method Patents Bad For Business?*, 16 SANTA CLARA COMPUTER & HIGH TECH. L.J. 263 (2000) (regarding business method patents); Chiappetta, *supra* note 43, at 192 (arguing that the competitive arts do not benefit from the patent model); Andre J. Porter, *Should Business Method Patents Continue to Be Patentable?*, 29 S.U. L. REV. 225, 225 (2002) (discussing the rising importance of business methods patents since the advent of the internet); Brian P. Biddinger, *Limiting the Business Method Patent: A Comparison and Proposed Alignment of European, Japanese and United States Patent Law*, 69 FORDHAM L. REV. 2523, 2524 (2001) (pointing out that how technology is defined has become an increasingly difficult problem).

50. *See* 35 U.S.C. § 101 (2006) (defining inventions patentable as "[w]hoever invents or discovers any new and useful process, machine, or composition of matter, or any new and useful improvement thereof, may obtain a patent thereof, subject to the conditions and requirement of this title"); *see also* R. CARL MOY, MOY'S WALKER ON PATENTS § 5:4 (4th ed. 2010) (describing that the statute is likely the foundation for the broader interpretation of "invention").

This broader approach is illustrated by the recognition that the U.S. system of patent law has historically given credit to inventions originating in occupations where women have been more dominant and fields where women traditionally were and are more likely to contribute to increasing the general welfare. Take for example, a pediatric speech therapist that wants to benefit from patent law protection for a diagnostic method that she invented. According to the narrow approach, in order for her invention to merit protection, the invention requires a technological anchor, such as a computer-based tool. Under the narrow approach, this invention might not be entitled to the protection of patent law and is unlikely to benefit from any other protection.[51] Conversely, under the broader interpretation a non-technological invention, such as a speech therapy diagnostic tool, may be recognized as patentable.[52]

The fields wherein women tend to contribute to human welfare are those in which women are dominant, active, and creative. For example, the World Intellectual Property Organization (WIPO) has identified a new field of "social inventions," as a field that benefits from women's work.[53] A "social invention" is a new imaginative solution to social problems or to unsatisfied social needs, such as a new method to improve the quality of life or a new organizational structure.

Another example presents itself when women, as educators, develop methods or tools for improving teaching and learning abilities or as psychologists create diagnostic techniques. Assuming that therapeutic methods are not an exception, the broad approach, unlike the narrow one, is likely to recognize these innovations and thereby protect inventions that reflect the activities where women are currently dominant.[54] Therapeutic and educational methods under the narrow approach, however, are not adequately protected. There is no doubt that it is less difficult, in actual practice, to obtain patent protection for such developments if the invention is related to a technological application.[55]

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51. *See* 35 U.S.C. § 101.

52. *See* DONALD S. CHISUM & MICHAEL A. JACOBS, UNDERSTANDING INTELLECTUAL PROPERTY LAW 2-26 (1996) (noting that the U.S. Patent office indicated that therapeutic-medical treatment methods are patentable if they meet the process and the conditions of utility, novelty, and non-obviousness).

53. *See* William Hartston, *The Institute for Social Inventions: Feeling Lucky, Punk?*, THE INDEPENDENT (London) March 10, 1994, *available at* http://www.independent.co.uk/arts-entertainment/the-institute-for-social-inventions-feeling-lucky-punk-1428142.html (describing the results and general application for the field of social inventions).

54. *But see* MOY, *supra* note 50, at § 5:4 (noting the divided opinions about the defensibility of human involvement for patents).

55. *See id.* at 5-15 ("Speaking generally, there is a strong consensus that the patent system currently exists to foster the development of applied technology . . . .").

The flexible, broad definition customary in the United States, while improving the narrow approach, is itself not free from gender perspective criticism. Despite the flexibility and expansion of the definition, effectively including more women inventors, large areas of female activity remain excluded from the definition of "invention." The developing legal precedents, which are not guided by a desire to promote equality, have influenced the way in which cases are decided. Many of the inventions, which have been recognized as patentable, are in fields where men are more dominant.

### *D. The* Bilski *Case: Broad vs. Narrow Approach*

Even though U.S. courts have expanded the applications protected by patent law to include fields that are neither technological nor industrial, the technological and industrial demands derived from the international definitions that include the phrases, "in all fields of technology" and "industrial application"[56] has recently influenced the traditional American conception of patents.[57] In other words, the law is not totally immune to the recent trend. Some voices explicitly promote the inclusion of machine and tangible requirements in U.S. patent law and reject Business Methods as being patentable.[58] Coupled with the extensive criticism of U.S. courts for recognizing patentable Business Methods, this has led to a retreat from the broader U.S. definition of a patentable invention and an about-face toward including a Machine Test as a threshold requirement. This trend is clearly evident in the In re *Bilski* U.S. Court of Appeal for the Federal Circuit deci-

56. *See Part II – Standards Concerning the Availability, Scope and Use of Intellectual Property Rights*, WORLD TRADE ORG., http://www.wto.org/english/tratop_e/trips_e/t_agm3_e.htm (last visited Oct. 20, 2010) (stating that the patentable subject matter includes any inventions in any technology fields).

57. *See* MOY, *supra* note 50, at § 5:4 (discussing the existence of judicial exceptions that limit the patent law system to matters where technology has been applied); Biddinger, *supra* note 54, at 2524 (providing that traditionally patents were meant to protect advancements in technology). *But see* Dreyfuss, *supra* note 49, at 264-65 (explaining that the Congress and American people started to recognize that information products are a large part of the economy, appreciate the value of intellectual work, and support the creative community producing such work with intellectual property rights); Chiappetta, *supra* note 50, at 182 n.2 (explaining that the United States has recently broadened the scope of patentable subject matter such as including business method patenting); Porter, *supra* note 49, at 225 (noting that "business method patents have taken center stage of discussions regarding patentable subject matter").

58. *See* AT&T Corp. v. Excel Comm'n, Inc., 172 F.3d 1352, 1359-60 (affirming the principle that for a claimed invention to be a patentable subject matter, the invention must produce a useful, concrete and tangible result); MOY, *supra* note 55, at § 5:30 (stating that change in approach to the business methods occurred as a result of them being anchored in computer technology); *see also* Burk & Lemley, *supra* note 43, at 1156 (arguing that the U.S. patent law, while it is technology-neutral in theory, tends to be lenient in granting patents to computer technology, compared to other fields such as biotechnology).

sion[59] (the trend was later overturned by the Supreme Court).[60]

The *Bilski* case deals with the question of whether or not a Business Method can be recognized as a patentable invention. The U.S. Court of Appeals for the Federal Circuit held the narrow opinion.[61] The ruling was appealed to the Supreme Court, which favored a broader approach in relation to the EPM definition.[62] For the purposes of this Article, it should be noted that the *Bilski* decisions, although relevant to the gender divide, did not consider gender issues in any way, shape, or form.

Although the Federal Circuit's majority decision was rejected by the Supreme Court, we cannot ignore the voices favoring the narrow approach. All former instances and almost all of the Federal Circuit judges sought to adopt the narrow approach. Furthermore, the Supreme Court, like the Federal Circuit, denied the patent because the Business Method in question was an unpatentable abstract idea.[63] Moreover, the Supreme Court did not reject the narrow approach totally, ruling that by "disapproving an exclusive machine-or-transformation test, we by no means foreclose the Federal Circuit's development of other limiting criteria that further the purposes of the Patent Act and are not inconsistent with its text."[64]

The Federal Circuit's decision represents the "masculine" narrow patent approach. The majority opinion held that a claim process is a Patent Eligible Matter if (1) it is tied to a particular machine or apparatus; or (2) it transforms a particular article into a different state or thing.[65] Moreover, the majority concluded that this "machine or transformation test" is the sole test for determining patent eligibility of a "process" under section 101 of the patent law.[66] The court applied the test and held that the application in question was not patent eligible.[67] The definition of EPM was thereby contracted (until the decision was overturned) by adopting "masculine" thre-

59. *See In re Bilski*, 545 F.3d 943, 963 (Fed. Cir. 2008) (holding that purported transformation of business risks or other abstractions are not physical objects, thus do not represent a transformation of an object into a different state, which is required to be patentable).

60. *See* Bilski v. Kappos, 130 S. Ct. 3218, 3221 (2010) (ruling that the 'machine-or-transformation' test is only a factor in determining whether an invention is patentable).

61. *See id.* (pointing out that the Federal Circuit misinterpreted the machine-or-transformation test as exclusive or exhaustive).

62. *See id*. at 3229 (explaining that business methods may be within the patentable subject matter according to the Patent Act).

63. *See id*. at 3229-30 (explaining that abstract ideas are not patentable).

64. *Id*. at 3231.

65. *See In re* Bilski, 545 F.3d 943, 961-62 (Fed. Cir. 2008) (explaining the rationale behind the machine-or-transformation test).

66. *See id*. at 961 (rejecting the "physical steps" test).

67. *See id.* at 963 (holding that business methods cannot meet the test because they are not physical objects or substances).

shold criteria, such as the use of a "machine," or the "transformation" test that applies only to physical substances and the test requiring a tangible, physical object. For example, in describing the decision's criteria for a patentable invention, Judge Paul R. Michel wrote:

> The machine-or-transformation test is a two-branched inquiry; an applicant may show . . . that his claim is tied to a particular machine, or . . . [show] that his claim transforms an article. [A]bstractions cannot meet the test because they are not physical objects or substances, and they are not representative of physical objects or substances."[68]

This narrow interpretation is not derived from the language of the law.[69] According to the Supreme Court's later decision, the law includes a list of requirements that can be interpreted as alternative requirements.[70] Influenced by the global narrowing trend, the Federal Circuit gave precedence to certain terms (such as "machine") over others, making "new and useful art" subordinate to the "machine" test and interpreting terminology that could be considered neutral, such as "transformation," as including a threshold requirement of "physical and tangible."

Other judicial opinions in the decision, both in the majority and in the minority (except for Judge Pauline Newman), supported this stance.[71] For example, in a dissenting opinion Judge Haldane Robert Mayer wrote that "the patent system is intended to protect and promote advances in science and technology . . . ."[72] Further, he claimed that the famous *State Street* and *AT&T* decisions recognizing business methods as patentable inventions should be overruled.[73] Judge Newman was the only one who disagreed. In her dissenting opinion, Judge Newman wrote that the "court's redefinition is contrary to statute and to explicit rulings of the Supreme Court and this court."[74]

Judge Newman did not directly refer to the gender aspect, but her words are useful in promoting patent protection for women's fields of activity. Reading her words in light of principles outlined in this Article leads to a renewed understanding of the expansive definition of "invention" against a

68. *Id*. at 961-62.

69. *See Bilski*, 130 S. Ct. at 3226 (emphasizing that courts should not read into patent laws limitations and conditions not expressed by the legislature).

70. *See id*. at 3227-28 (explaining that the list of patentable subject matter is phrased in the disjunctive).

71. *See Bilski*, 545 F.3d at 974 (stating that the need to accommodate technological change does not force courts to rewrite the relevant statute as to include human activities that do not involve machines).

72. *Id*. at 998 (Mayer, J., dissenting).

73. *See id*. at 1000-01 (explaining that before *State Street* was decided, this court correctly held that patents were designed to protect technological innovations, not abstract ideas).

74. *Id*. at 977 (Newman, J., dissenting).

background of gender. Adopting Judge Newman's position in line with keeping to the traditional U.S. approach makes it possible to recognize women's work as eligible for patent protection. A narrower definition would exclude both the inventors of business methods and the women creating in non-technical fields such as education and psychology. Judge Newman further explained:

> The court . . . by redefining the word "process" in the patent statute . . . exclude[s] all processes that do not transform physical matter or that are not performed by machine. The court thus excludes many . . . kinds of inventions . . . . The Supreme Court has consistently confirmed the constitutional and legislative purpose of providing a broadly applicable incentive to commerce and creativity, through this system of limited exclusivity.[75]

The Supreme Court, in accordance with Judge Newman's dissent, overturned the Federal Circuit and ruled in favor of the broader approach, going so far as to state that the statute itself acknowledges that there may be a business methods patent.[76] Accordingly, the Supreme Court held that the Federal Circuit's interpretation was inconsistent with the plain language of the Constitution and the law. Under 35 U.S.C. § 100(b), the term "process" means "process, art or method, and includes the new use of a known process, machine, manufacture, composition of matter, or material."[77] The Supreme Court explained that they are unaware of any ordinary, contemporary, common meaning of "process" that would require it to be tied to a machine or transformation of articles.[78] However, although the Supreme Court overturned the Federal Circuit's rationale, they affirmed its final decision in rejecting Bilski's Business Method as patentable. The Supreme Court concluded that the application was rejected on the basis of unpatentability of abstract ideas.[79]

This Article highlights the importance of re-examining the definition of "invention" in patent laws worldwide. In most countries, the definition of "invention" emphasizes the elements relating to machines, industry, and technology. In its current form, this definition favors men and fails to reflect the contribution of women to human welfare. One suggestion is to

75. *Id*. at 976.

76. *See Bilski*, 130 S. Ct. at 3222 (noting that applicable statutory defenses indicate that business methods are "simply one kind of 'method'").

77. *See id*. at 3225 (explaining that Congress intended to give patent laws a wide scope).

78. *See id*. at 3221-22 (noting that the machine-or-transformation test was never considered exhaustive or exclusive).

79. *See id.* at 3231 (rejecting the "machine or transformation test" as the sole test for determining that a product or a process is patententable, and ruling that the language of 35 U.S.C.A. § 101 does not disallow all business methods from being patented).

change the definition of EPM to include inventions created from women's life experiences in areas such as education, psychology, social work, and relevant Business Methods.

Although the Supreme Court adopts this notion, it is important to note that the Federal Circuit ruled otherwise and that movement toward a narrowing approach remains prevalent. Limiting the definition of EPM by attributing greater importance to technology and industry is effectively equivalent to adopting the narrow TRIPS definition and is very undesirable from the perspective of gender equality.

### *E. Supporting Data: How Many Women Inventors are There?*[80]

Statistical data supports feminist criticism of the narrow EPM definition because it reveals the near exclusion of women in a narrow approach patent legal system. To date, only partial statistics are available regarding the number of women inventors around the world.[81] As set forth in this Article, while women inventors are a minority of all inventors in the fields examined in this study, they are an especially small minority in countries that adopt the narrow approach.[82]

The Israeli legal system is an adequate example of the connection between the narrow approach to EPM and the deficit of women inventors. In Israel, the narrow definition of an invention, translated literally from the TRIPS agreement prevails:

> Israeli Patent Law, Section 3:
> "Patentable invention" is defined as an "invention, in any field of technology. . . which is capable of industrial application."[83]

The low number of women inventors in Israel makes a good case study

80. In this study, "inventor" refers to (independent) women inventors. The research focuses on the proprietary sense of the words "woman inventor," and not on describing the woman inventor working in an invention-rich field. The words are not arbitrary, they are derived from the central discourse on women's exclusion from proprietary rights and, therefore, from the main channels that lead to resources, power, control, welfare, honor, self-fulfillment, etc. *See generally How Many Women Inventors are There?*, ABOUT.COM, http://inventors.about.com/library/inventors/blwomen inventors.htm (last visited Oct. 20, 2010).

81. *See generally id.* (showing that, for the sources do not clarify their use of the term "women inventor," it is likely that they also include women inventors who do own property rights to their inventions).

82. *See* Frietsch et al., *supra* note 17, at 594-95 (stating that during the span of 2003-2005, the relative contribution of women in patent applications averaged around 8%, but finding an increase in the number of women inventors in the pharmaceutical and bio-technology fields); Patricia Carter-Ives, *Patent and Trademark Innovations of Black Americans and Women*, 62 J. PAT. OFF. SOC'Y 108, 113-14 (1980) (noting a 1935 study, which indicated that women received approximately 15,000 of 2,100,000 issued patents); Thomas Frey, *A Study of Women Inventors*, FUTURISTSPEAKER.COM (Aug. 4, 2008), http://www.futuristspeaker.com/2008/08/a-study-of-women-inventors/ (reporting that in 2002, 10.9% of all patents were named with women inventors).

83. Patent Law, 5727-1976 (Isr.).

because Israel has a well-developed patent industry and ranks highly in terms of the number of patents granted *per capita*.[84]

Research done for a previous study found that in 2000-2005,[85] in Israel,[86] the number of Israeli women inventors who applied for patents in Israel was only 1.9% out of all applicants (including corporations).[87] The ratio of female inventors to male inventors, excluding the corporate group,[88] was 5.95%[89] during the same period. To look at the figures in a different light, in thirty-six out of the sixty months examined, not one single woman applied for a patent, as the owner of its rights. In the remaining months, only a few (one to three) women inventors, who have property rights over the patent, submitted applications that were accepted.

Comparing Israel's statistics with the partial data available from the United States, which uses a broader interpretation approach to EPM, the U.S. clearly shows a significantly higher percentage (more than double) of women inventors.[90]

To address the technological industries in particular, research published in 2010 on women inventors in nanotechnology showed that women encompassed 11.2% of all inventors in this field. Furthermore, the percentage of patents granted to entire research teams that included a minimum of one female inventor was 16.7%.[91]

The Patent Statistics Reports section of the U.S. Patent and Trademark Office (PTMT) website compiles reports based on several categories[92] in-

84. *The International Patent System in 2008*, WIPO, http://www.wipo.int/pct/en/activity/pct_2008.html#P219_13270 (last visited Oct. 20, 2010).

85. *See* Yanisky-Ravid, *supra* note 24, at 359 (studying applications that were received and accepted by the Israel Patent Office during a defined period, based on data published in the Patent and Trademark Record).

86. *See id*. (explaining that only patent applications that Israelis filed with the Israeli Patent Office are included).

87. *See id.* at 357-59 (looking at applications which were submitted by the owner of its rights).

88. *See id*. at 359 (including commercial and other organizations, such as hospitals and universities or related corporations that filed patent applications in their names, which were accepted in Israel at the time).

89. *See id.* at 357 (providing research showing that employee women inventors generally work as part of a team).

90. *See How Many Women Inventors Are There?*, *supra* note 80 (discussing the first female American patent holder and estimating that in the United States, approximately 20% of all inventors are female); *see also* U.S. PATENT & TRADEMARK OFF., DEP'T OF COMMERCE, PATENT COUNTS BY CLASS BY YEAR (2009), *available at* http://www.uspto.gov/go/taf/cbcby.htm#PartA1-1 (supplying only partial data because the U.S. Patent Office does not ask applicants to identify themselves by gender).

91. *See* Meng, *supra* note 16, at 12 (explaining that the percentage of patents granted to male research teams is twice as large).

92. *See Calendar Year Patent Statistics (January 1 to December 31) General Patent Statistics Reports Available for Viewing*, U.S. PAT. & TRADEMARK OFF.,

cluding one statistical report concerning women inventors.[93] The report states that the "percentage of patents granted within ownership category which have at least one women inventor, American origin, was more than 10% in 1998."[94] The percentage today should be higher because the number of women inventors increased five-fold in the twenty years covered by the study.[95] Another study reported approximately 20% women inventors.[96]

There is also data showing that the percentage of female inventors is higher in areas of non-classical technology, such as biology, than in mechanical and electronic fields.[97]

U.S. origin utility patents pertaining to chemical technologies have the highest percentage of women.[98] Utility patents have been roughly divided into chemical, electrical and mechanical technology categories based on their primary or "original" classification within the U.S. Patent Classification System (USPCS).[99] A study conducted on this basis found that patents pertaining to chemical technologies have the highest rate of participation by women inventors:[100] "[N]early half of the U.S. origin woman-inventor patents issued during the 1977 to 1996 period pertain to chemical technologies, while 36.2 percent pertain to mechanical technologies, and only 14.3 percent pertain to electrical technologies."[101] The percentage of U.S. origin patents compares somewhat positively with the percentages for France and Sweden.[102]

When sorted by category, a review of the number of applications submit-

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http://www.uspto.gov/web/offices/ac/ido/oeip/taf/reports.htm#by_invt (last visited Oct. 20, 2010) (including studies titled Patent Counts by Class and Year, Independent Inventors, and Prolific Inventors Receiving Utility Patents, 1988-1997).

93. *See generally* U.S. DEP'T OF COMMERCE, PAT. & TRADEMARK OFF., BUTTONS TO BIOTECH: U.S. PATENTING BY WOMEN, 1977 TO 1996 (1999) [hereinafter BUTTONS TO BIOTECH], *available at* http://www.uspto.gov/web/offices/ac/ido/oeip/taf/wom 98.pdf (showing ownership of U.S. origin woman-inventor patents from 1977 to 1998).

94. *See id.* at Appendix Table 4-1 (showing that in 1998, only 10.8 percent of U.S. patents inventors were received by U.S.-resident women).

95. *See id.* at 8 (completing the study in 1996).

96. *See How Many Women Inventors are There?*, *supra* note 80 (distinguishing unclearly between independent inventors and women employee-inventors).

97. *See* BUTTONS TO BIOTECH, *supra* note 93, at 11, figure 4 (separating patents into categories of utility, design, plant, and other).

98. *Id.*

99. *See id.* (acknowledging that less than 0.1 percent of patents are currently not classified under this method).

100. *See id.* at 12 (depicting the study's findings concerning the annual share of U.S. Origin Patents which have a women inventor, by technology).

101. *See id* at 11-13, figure 5 (demonstrating that the categories with the lowest percentage of woman-inventor patents are brakes, fluid-pressure and analogous brake systems, and joints and connections, each at zero percent).

102. *Id.* at 8.

ted for patents also support the connection between the narrow vs. broad approach and its effects on women. In countries where the definition of a patentable invention includes an industrial component, applications submitted are primarily in technological-industrial fields including electronics, mechanics, computers, communications, and industrial chemistry—all areas where men reign dominant. In contrast, in the United States' broader regime, it can be seen that there are "softer" fields such as biochemistry, biology, and organic elements with a more significant female presence.[103] It is clear that this higher percentage of female inventors cannot be maintained if the definition of a patent narrows the focus to machine-technological-industrial elements.

### *F. The Case for Expanding the Definition of Patentable Invention*

Recognition of general legal patent protection for "female" innovations will encourage progress and development in "female" fields and subsequently increased efficiency by organizing untapped female markets. This recognition will lead to the commercialization of additional activities in those fields by encouraging smaller players in the market to create and generating a climate of accessibility that stimulates more women to invent. The broadened protection will also act to foster cooperation between sectors with different gender characteristics. The long-term result will be an improvement and enrichment of work accomplished by women inventors available to the public.

Applying the globally prevalent rationale of promoting welfare only to technological inventions discriminates against a majority of women who are responsible for the welfare achieved through inventions in other non-technical and "non-machine" fields.[104] Increasing patent protection is the

103. *See* BUTTONS TO BIOTECH, *supra* note 93, at 13 ("The three classes of technology having the highest share of woman-inventor patent grants in 1996 are (1) *Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof* (27.8 percent); (2) *Chemistry: Molecular Biology and Microbiology* (26.4 percent); and (3) *Organic Compounds, Class 548* (26.1 percent)."); *see also* ISRAEL MINISTRY OF JUSTICE, ANNUAL STATISTIC INFORMATION ON THE PATENT, DESIGN AND TRADEMARK ACTIVITIES: PATENT APPLICATIONS SORTED BY AREA YEAR 2004 (June 7, 2004), *available at* http://www.justice.gov.il/NR/rdonlyres/EA739A38-EFCD-413C-9A7B-A9D113C1492B/0/PTAPPAREA2004.bmp (providing statistics for seven categories of Israeli patent applications).

104. *See* MOY, *supra* note 50, at § 5:8 (discussing the limitations of the traditional paradigm that defines patent-law). *See generally* Dreyfuss, *supra* note 49, at 263-64 (summarizing recent changes in intellectual property law); Chiappetta, *supra* note 43, at 182-83 (arguing for the reassessment of normative differences implicit in TRIPS); Porter, *supra* note 49, at 225-26 (theorizing that the American approach to business method patents will obstruct uniformity with the world patent system). Criticism of the patent system and its expansion claims that patent protection hampers development and free competition of individuals and companies. *See* Biddinger, *supra* note 54, at 2523-26 (arguing against the patentability of business methods); Andrew R. Sommer, *Trouble on the Commons: A Lockean Justification for Patent Law Harmonization*, 87 J.

best legal way to protect women's inventions effectively and to bring them to the same level as men. By going through alternative routes, i.e., suggesting other types of protection for women's activity, the level of protection would not be the same as it would for a patent. Even if copyright protection proves coextensive (and has its own benefit as it lasts longer), the application of different type of protections to different genders will lead to the separate and unequal protection to women.[105]

The broadened definition of an invention needs to be decided cautiously. Inventions that are protected by patent law give their inventors significant and exclusive rights. The free use of patents deprives the public, during the term of exclusivity, and requires them to request a license and pay royalties in order to use the invention. The result, if not carefully balanced, might be paradoxical: the more we expand the definition of Eligible Patent Matter—to further women's cause—the more we might limit the development of the field we want to advance.[106]

It cannot be denied that moving the value of gender equality from the margins of patent discourse to the center will have its price, but the proper balance can be found between achieving real targets on the path to equality in the field of inventions and the price incurred for that achievement. By addressing and rehabilitating the current state of patent law with caution and working to balance the needs of male and female inventors and the rights of the public, a better, more gender-equal balancing point will be achieved; one that, unlike the current state, serves everybody's interests equally.

The conclusion cannot be avoided: perpetuating the current situation and a definition of EPM that serves as beneficial only to one gender is inappropriate. The present state of patent law in many countries, by its definition, discriminates against women, prevents the upward mobility of women, and exacts a heavy social and economic price. The existing definition serves to create and uphold an ever-growing male elite with economic power while preventing growth and development of other non-technological fields that are important to promoting welfare in society today.

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PAT. & TRADEMARK OFF. SOC'Y 141, 142 (2005) (arguing that any expansion of patent protection is detrimental to the public). *But see* Burk & Lemley, *supra* note 38, at 1205-06 (asserting that patent law should be more flexible, so as to include different inventions).

105. *See* Nicholas A. Smith, Note, *Business Method Patents and Their Limits: Justifications, History, and the Emergence of a Claim Construction Jurisprudence*, 9 MICH. TELECOMM. & TECH. L. REV. 171, 184-85 (2002) (discussing the significance of disparate patent law approaches to business method).

106. Furthermore, a balance must be found otherwise it might become impossible to enforce overbroad monopolistic rights to protect these inventions because they are used so extensively in many areas of life. In the United States, such criticisms have emerged in protest of expanding patent protection to include business methods.

Only with the return of an egalitarian starting point will the current segregation between women's and men's occupations be understood, the importance of equality and women's contributions be internalized, and the ability to formulate a more egalitarian definition of invention be possible.

### *G. Relevant Findings*

The decision to define "invention" in a technological-industrial manner, as done in many countries, reflects a desire to promote welfare,[107] innovation, and knowledge, primarily vis-à-vis technological and industrial inventions and patents.[108] This criterion, however, is androcentric. When it was "decided" to use these industrial terms as part of the definition of a protectable patent, it was known that the technological-industrial fields were (and are) primarily controlled by men. By using a perspective based on a male model, whether intentionally or otherwise, a decision with widespread and international effects was made to adopt a "masculine" characteristic as the threshold condition for the legal creation of a patent.

Cultural feminism argues the necessity of considering the differences in women's contributions to society and the inventing process and the need to value them equally. Therefore, taking a critical look at current threshold requirements means legal tests must be established using feminine traits in addition to the already recognized masculine tests (innate or acquired, natural or attributed) and women must be granted the rights that, in this case, originate in patent law.

Supporters of liberal equality respond that the definitions of "invention" are open to all genders and represent an equal opportunity to all who wish to participate; as such, women can integrate into technological systems and create inventions. However, this claim fails to address the crux of the problem leading to the exclusion of women: the threshold and masculine criteria that serve as the foundation of the definition of patents.

According to the radical feminist approach, the concept of equality does not reflect two-sided equality between the sexes. The claims of so-called equality are merely unidirectional. The meaning of "equal" amounts to "equal to a man." Women are compared to men and not the opposite. In order for women to be granted resources and rights, they need to prove, as a threshold condition, that they have "masculine" characteristics and, there-

107. *See generally* Daphna Lewinsohn-Zamir, *The Objectivity of Well-Being and The Objectives of Property Law*, 78 N.Y.U. L. REV. 1669 (2003) (indicating how legal tools are used to advance economic welfare).

108. *Compare id*. (addressing the use of patent law as a tool to promote the quantity and quality of innovative products and hence enrich the welfare of the public), *with* Sarnoff, *supra* note 25, at 15-17 (suggesting that the exclusion of "traditional" women's work from patentable categories has *benefitted* society by contributing to a robust public domain).

fore, are entitled to the benefits granted to the male group. The liberal so-called equal opportunity does not consider the idea that women have their own standards. Instead, women are effectively made to ask for rights that they deserve from the beginning.[109]

Even if one remains unconvinced that the definition of a patent excludes women inventors, the ideas discussed in this Article and the same rationale can be applied to current statistics (discussed supra) to encourage equality where equal footing has yet to be found. As explained above, the law serves to create and perpetuate social gaps, but it also has the ability to close them. Therefore, it is still possible to use legal definitions to correct the gaps, even if their origin is unidentified. The solution, according to cultural feminist theory, is to "rewrite" the criteria to include women's experiences and move toward granting them equal value. Placing gender-equality as a value in the center of legal discourse will lead to more egalitarian criteria that also reflect the feminine voice. After making this change, it will be possible to accommodate patent applications in new categories, such as social, educational, psychological, and familial inventions, alongside the familiar categories of electronics, mechanics, and computers.

The exclusion of women transmits an antidemocratic message. Obstacles keeping women at a distance from potential access to resources and power are an impediment on the way to achieving distributional justice. Exclusion transmits a stereotypical and un-educational message that places women in a disadvantaged position. Furthermore, exclusion leads to economic inefficiency by discouraging the advancement of entire fields and not taking maximum advantage of human potential.

The integration of a new voice requires finding new words and creating new methods.[110] Additional research is required in order to identify fields that can be included in the definitions of invention; however, opening the "opportunity gate" to women inventors by changing the definitions to more egalitarian ones is only the first stage. Once the definitions are rewritten, women will be occupied with inventing, whether in the technological and industrial fields prevalent today or in one of the other occupational areas that will be included in the new legal definitions of "invention" and "inventor," as proposed in this Article. Nevertheless, by changing the defined terms alone, it is doubtful that these women will be awarded complete property rights in their inventions. There is a second and essential stage necessary to women's progress, which is examining the mechanisms that

109. *See* MACKINNON, *Difference and Dominance*, *supra* note 6, at 32-35 (noting that there are two alternate paths to equality for women: either be the same as men or be different from men).

110. *See* GILLIGAN, *supra* note 12, at 1-4 (noting that there is a disparity between women's experience and representation of human development in psychological and literary texts, which has generally evinced a problem in women's development).

ensure fair rights to women who develop inventions (such as, addressing the issue of who is considered an "inventor" for the purposes of allocating property rights). This mechanism is discussed separately in a subsequent article.

## III. RETHINKING EPM: CONCLUSIONS

### *A. Is Patent Law Gender Blind?*

Taking into consideration the insignificant number of women inventors, the interesting question arises: how did relevant international law (influencing many legal systems) develop as if there are no women?

One of the explanations for the creation of legal mechanisms that exclude women from many fields is the use of androcentric criteria,[111] meaning those rules and definitions are built on the basis of a masculine model. Androcentric rules are built too narrowly and often exclude women's experience. The use of these criteria inevitably results in a model that is not suited to women and perpetuates their exclusion from the distribution of resources and other benefits that the model promotes.

The hurdles that must be overcome before putting reforms into place are lofty. Exposing the androcentric structures is not simple. Historically, industrial intellectual property protection (patents) was distinguished from the cultural intellectual property protection (copyright). Patent law was established to distinguish industrial, scientific, and conceptual discoveries from cultural creations.[112] The gender-bias is part of the historically categorization. Moreover, for centuries, both men and women have internalized the idea that these ideals are the appropriate standard of measure and only justifiable criteria. Further, the only noticeable testimony to the need for a critical examination of the principles is the resulting gender segregation and resultant discrimination. The causal relationship between the principles and the discriminatory result is not always clear. The absence of negative intent, the lack of evidence for a masculine "conspiracy" and other values (advancement of science, technology, and economic welfare) that justify the principles all hamper critical examination of the status quo. Finally, rescinding principles that are deeply rooted in the legal and economic

111. *See id.* at 62-63 (suggesting that society's hierarchical and gender based structure negatively impacts one's conception of the self); SANDRA LIPSITZ-BEM, THE LENSES OF GENDER-TRANSFORMING THE DEBATE ON SEXUAL INEQUALITY 73-79 (1993) (chronicling recent Supreme Court jurisprudence); CATHARINE A. MACKINNON, SEXUAL HARASSMENT OF WORKING WOMEN: A CASE OF SEX DISCRIMINATION 106-26 (1979) (comparing two different theories concerning gender discrimination in the American legal system).

112. *See* Sarnoff, *supra* note 25, at 38 (explaining that after the revolutionary law, there was an effort to encourage the development of literature through copyright law).

system, which have become foundation stones for the entire system over the years, is considered impossible or unjustifiable.

Taking all this into account, it is apparent that fighting against discrimination barriers has its cost. In addressing the gender issues highlighted in this Article, policy makers will have to decide, after considering the gender aspects explicitly as an equal factor, whether they are willing to pay this cost.[113]

As set forth above, among the various suspect legal principles, special attention should be paid to the definitions used. Definitions by their very nature are critical guardians with the political power to determine who is permitted to enter a certain field (and benefit from its distributions). The definitions at a threshold level determine who remains outside that field. From this perspective, the definitions are even more important than the other principles of distribution that apply to those who pass the definitions' filter.

This Article seeks to question the framework of discourse about intellectual property as lacking the important discussion focused on the imbalance between genders, the reasons for that imbalance and the promotion of gender equality. The Article relates to the laws of invention as a part of the greater rubric of property law.

Research focusing on the distribution of power that emerges from property ownership relates to intellectual property law including patent law as part of the comprehensive set. The main purpose of this Article is to draw attention to existing problems because, without the explicit centralized recognition that the interpretation of property is a factor for promoting gender equality, the legal-property discourse will continue to exclude women.

The dissonance between property laws and the principal of equality is problematic. The solution is found in a new and different perspective on intellectual property law—considering the legal mechanisms in place in the context of gender as central to the discourse. Incorporation of equality discourse in the analysis of intellectual property laws will lead to the examination of the issue in the light of the following important questions: Are the principles used for achieving intellectual property applied equally to men and women? Do the definitions of intellectual property exclude women from their application? What changes should be made in light of awareness of the principles of equality as they impact property discourse from its center rather than the margins?[114]

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113. Policy makers should consider the problem resulting from changing the patent system in the effort to provide more fair and equal treatment to women and other groups.

114. *See* Joseph W. Singer, *The Reliance Interest in Property*, 40 STAN. L. REV. 611, 637-41, 711-14 (1987) (elaborating on the free market model and the problems with free market assumptions).

While this Article focuses on the plight of women inventors, the legal principles exclude not only women from property rights in their inventions and patents, but also other groups.[115] In other words, the same principles which discriminate against women, also discriminate against other groups. The solutions for all types of exclusion from patent rights can be similar. Therefore, the discussion of women's exclusion will likely contribute to dealing with the exclusion of other groups from the field of inventions. The goal of this Article was inspired by Professor Gilligan's voice: "My goal is to expand the understanding of human development by using the group left out in the construction of theory to call attention to what is missing in its account."[116]

### *B. Changing Existing Legal Structures*

The legitimacy of the current definition of an "invention" and who is an "inventor" should be reconsidered from the perspective of the human progress, which is inherent in the definition itself. The definitions should be closely examined on the basis as to what extent the narrow definitions eliminate the potential contributions of women.

The relevant definitions need to be changed via international treaties because the definition of "invention" is derived from the definition in the TRIPS Agreement and other international treaties. Further, international recognition of the need for gender equality is a global issue. As noted, the definition of invention is neither static nor unchangeable; it has been changed in the past and is likely to change in the future on both international and local levels. Rethinking what is considered EPM in the United States is also important. The discourse between the Supreme Court and other courts, as discussed above, reveals different voices that cannot be ignored. The U.S. Legislature and Supreme Court should consider gender as a main factor as they reshape relevant definitions.[117]

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115. Women are a majority of the population. Advancing women in the field of invention as an international strategy is, first and foremost, a national, economic interest because of the desire to enrich and advance the patent field. *See* H. Anne Kelly, *A Woman's Place: Women's Emerging Role in Technology*, 77 J. PAT. & TRADEMARK OFF. SOC'Y 412, 413 ("America's future will depend heavily upon the creative capacity of women."). *See generally* European Comm'n Directorate-Gen. for Research, *She Figures 2003: Women and Science Statistics and Indicators*, Eur. 20733 (2003) (stating results of a methodological study concerning the entry of women into scientific fields in Europe); Carter-Ives, *supra* note 88, at 108 (discussing the contribution of black women in American patent and trademark innovation).

116. GILLIGAN, *supra* note 12, at 3-4.

117. *See* Sarnoff, *supra* note 25, at 108-09 (discussing Supreme Court jurisprudence concerning the novelty and obviousness doctrines). Further research could inquire into relationship between each component of the EPM demands and its discriminatory effect. The obviousness doctrine may have greater gender-discriminatory effects than a simple novelty doctrine.

### *C. Summary*

The fact that a woman, Madame Curie, won the Nobel Prize—in physics in 1903 and in chemistry in 1911—may mislead the public from the dismal reality of women's true standing in the world of intellectual property. The percentage of women inventors is minuscule. Marie Curie's success is an exception to the norm.

The structures in place that perpetuate the division of gender roles lead to unacceptable outcomes. The historical and ongoing exclusion of women from recognition in the inventing process is not coincidental; their obscurity serves to distance women from power, resources, and status. Closer examination of the problem reveals that it need not be everlasting. The bias can be corrected through both legal as well as social changes. We should not forget that the legal system is the creation of humankind and is intended to serve everyone under its auspices.

This Article offers a basis for reform that would promote gender equality in the laws of invention. In the first stage, the broad definition as adopted by the U.S. (in contrast to the narrow international definition) should be adopted on an international level and by national legal systems. As such, the main purpose of this study is to begin a dialogue and to include gender as a legitimate consideration when shaping legal intellectual property principles. This is true also in relation to the U.S. patent legal system.

Integration of feminist insights about legally created hierarchical structures and the importance of integrating the "other voice" into legal-property arrangements will, if considered, lead to more egalitarian structures. Of course, change cannot be expected to occur immediately nor can suggested changes provide a solution for the current generation of women inventors who find themselves tied to professions that lack prestige and proper compensation. The suggested changes can begin to ensure that future generations of women do not have to suffer the same inequalities. In an era of growing awareness of equality between the sexes, as women's slowly changing self-perception allows them to recognize their own strengths, the time is ripe to reconsider and amend the law reflect these changes.