

On the Gendered Examination of Patents

Gita Ghiasi, Vincent Larivière

École de bibliothéconomie et des sciences de l'information, Université de Montréal

Introduction

The patenting gender gap is often attributed to the dearth of women in science, technology, engineering, and mathematics (STEM) fields. However, this explanation is untenable because the propensity of women with STEM degrees to patent barely exceeds that of those who lack them (Frenkel 2013). Other explanations include but not limited to organizational structure, gender differences in networking opportunities (Whittington & Smith-Doerr 2008), lack of exposure to commercial activities (Ding et al. 2006), lack of mentoring and institutional support for women, and lower rate of women's appointment to high profile administrative positions (Murray & Graham 2007), gender differences in attitudes towards risk, competition, scientific commercialization, involvement in different type of research, efforts in balancing work and personal life, gendered preferences of venture capitalists, and gender discounting (Stephan & El-Ganainy 2007). Along these lines, gendered practices in the patent examination could also contribute to the gender disparities in patenting. This study sheds light on these practices and examines gender patterns in the patent examination process across different disciplines and sectors. More specifically, this study provides a comprehensive gendered analysis of patent examination processes and tries to understand to what extent these processes are inclusive for women inventors.

Data and methods

This study examines 5,131,474 utility patents from 1976 to 2016 granted by the United States Patent and Trademark Office (USPTO), for which gender is assigned to at least one inventor and the patent examiner using universal and country-specific existing name and gender databases, including U.S. Census, WikiName, Wikipedia, France and Quebec lists, and country-specific lists (more details can be found in (Larivière et al. 2013)). The contribution from female inventors to a patent is measured as a fractional count of female inventors (the number of female inventors divided by the number of co-inventors of a patent to which gender is attributed).

The application processing time (or application length) of a patent is defined as the number of months between patent's application and issue date. Applications refer to requests for protection of inventions, whereas granted (or issued ones) are those patents that have not been rejected or withdrawn. Disciplines are assigned based on international classification codes (IPCs)¹ assigned to each patent, which includes eight level hierarchical classifications. In this study, disciplines are defined based on these eight section titles (codes: A-H), which are (A) Human Necessities, (B) Performing Operations; Transporting, (C) Chemistry; Metallurgy, (D) Textiles; Paper, (E) Fixed Constructions, (F) Mechanical Engineering; Lighting; Heating; Weapons; Blasting, (G) Physics, and (H) Electricity. Assignees are further categorized into government, industry, and individual sectors using the USPTO PatentsView's² (a patent data visualization and analysis platform) assignee type and assignees associated with the university sector are further identified using the keyword filters introduced in Ghiasi et al. (2015).

Results

Female contribution to patents is increasing over time. However, women's contribution is higher for patents that are evaluated by a female examiner (Fig.1). This finding is consistent across various sectors (Fig. 2) and disciplines (Fig. 3) and provide a strong implication for gender disparities in patenting. Since 82% of all patents are examined by male examiners, this could place women in a disadvantaged position in the sense that male patent examiners evaluate patents with higher contribution of men more favorably than female examiners.

¹ http://www.wipo.int/export/sites/www/classifications/ipc/en/guide/guide_ipc.pdf

² http://www.patentsview.org/querydev/query/data_dictionary.html

Female contribution to patents is highest in the academic sector and the fields of chemistry and metallurgy, and human necessities. However, the contribution of women is the lowest in patents assigned to industry and in the fields of constructions and mechanical engineering (Fig. 2 and 3). The processing time is shorter for male examiners and across those disciplines with lowest female contribution to patents (Fig. 3). These results could provide an in-depth insight into the underlying reasons behind women’s lower propensity to become engaged in patenting.

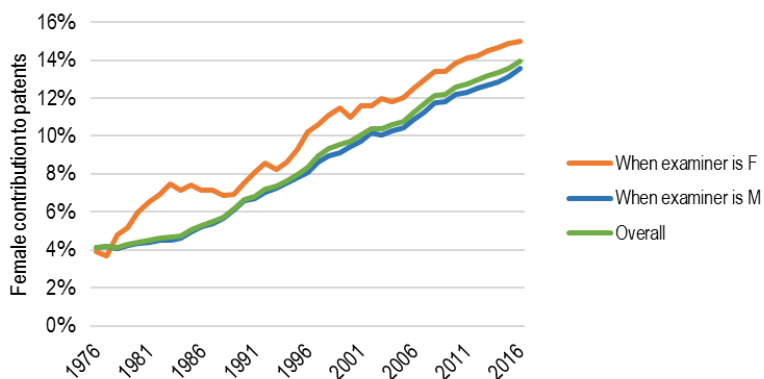


Figure 1- Women’s contribution to patents by examiner’s gender overtime (in 1976-2016)

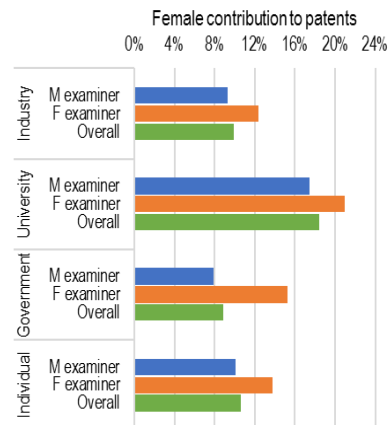


Figure 2- Women’s contribution to patents assigned to different sectors by examiner’s gender

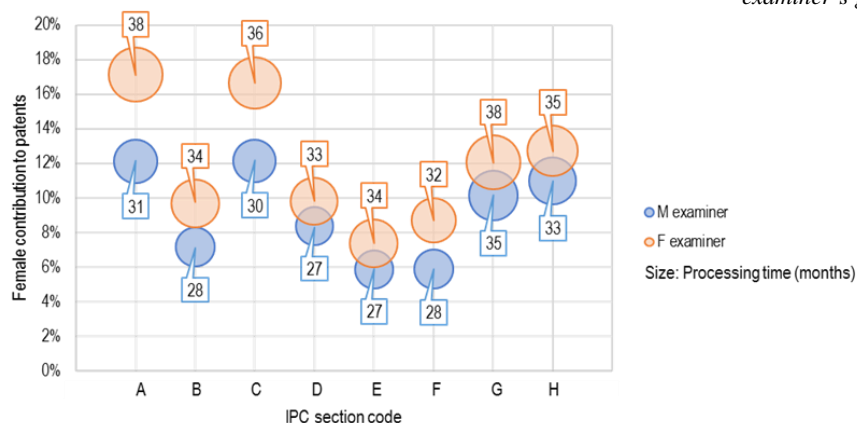


Figure 3- Women’s contribution to patents assigned to different IPC sections by examiner’s gender; Size of each node shows the average processing time (in months)

Discussion and conclusion

This paper is the first attempt that sheds light on the gendered practices in the patent examination process. The findings reveal that the contribution of women to patents has increased overtime but is still considerably low. Along these lines, when the patent examiner is a woman, the granted patent comprises higher contribution of women inventors. Similar results are found in various sectors and disciplines. Moreover, the average processing time is lowest for patents that are assigned to fields with lowest female contribution and examined by a male examiner, while is the highest for those examined by a female examiner and is assigned to fields with highest female contribution.

These practices could induce stark imbalances in gender and inclusion in patenting as women’s inventions are evaluated less favorably by male examiners (compared to female examiners) who are responsible for 82% of total patents granted in the USPTO. This study brings forth one of the possible elucidations for gender differences in inventorship and calls for gender-responsive policy mechanisms to provide women an environment conducive to more patenting engagement.

Type of submission: Presentation

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