Addressing Gender Underrepresentation: Evaluating Women's Participation on Editorial Boards in the Top 100 Research Journals Across Diverse Fields

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Abstract—The 2020 World Economic Forum report projected a century for achieving gender parity, but the Covid-19 Pandemic extended it by 32 years. Key obstacles include gender biases promoting male leadership, the gender pay gap, inadequate mentorship, and unequal caregiving roles. These disparities are also present in scientific journal editorial roles, with academia's biases resulting in fewer women being nominated or invited. Challenges like work-life balance difficulties, career breaks, and limited networking opportunities further hinder women's progression. This study, using data from the Web of Science, analyzed the gender distribution in editorial boards of 2020's Top 100 journals across various fields. Results indicate a significant gender gap in editorial roles, especially in editor-in-chief positions. This disparity is more pronounced in developing countries and in the Engineering field. Factors like the Science and Technology Disparity and the prevalence of STEM disciplines deepen this gender gap. The evidence underscores the broader importance of gender parity and its positive effect on journal metrics. This manuscript is intended for the Research Category of the FIE 2024 conference.

Keywords— Women in leadership, academic senior roles, editors, editor-in-chief.

I. INTRODUCTION

Systematic gender bias within the workforce, particularly concerning senior positions for women, remains a prevalent issue. Numerous factors contribute to this bias, perpetuating an uneven distribution of power and opportunities. First, deeply ingrained societal norms and stereotypes shape perceptions of gender roles, with leadership positions often seen as more fitting for men [1]. This bias leads to a lack of consideration for women when it comes to promotions and career advancement. Second, systemic barriers such as the gender pay gap, limited access to mentorship and sponsorship, and biased performance evaluations hinder women's progression to senior roles [2]. These barriers create a cycle of underrepresentation, as women face difficulties in gaining the necessary experience and visibility to secure high-level positions. Additionally, the absence of supportive policies and workplace cultures that promote work-life balance further disadvantage women, as they often bear a disproportionate burden of caregiving responsibilities. To address systematic gender bias and promote gender equality in senior positions, organizations must actively challenge biases, implement fair evaluation processes, provide mentorship and sponsorship opportunities, and foster inclusive work environments that value and support the advancement of women. While gender bias may exist in some workplaces, it is not a universal phenomenon and may be influenced by a variety of factors beyond societal norms and systemic barriers. For example, a study by Peterson and Bell (2019) found that women are more likely to be promoted to senior positions in organizations that prioritize diversity and inclusion, suggesting that workplace culture and policies can play a significant role in promoting gender equality. Additionally, some research suggests that women may face fewer barriers to career advancement in fields where they are overrepresented, such as healthcare and education [3]. While it is important to address gender bias and promote gender equality in the workforce, it is also important to consider the complexity of the issue and the potential for multiple factors to influence outcomes.

Women in academia face a multitude of challenges that hinder their progression to senior levels. First and foremost, gender biases and stereotypes persist, impacting the perception of women's capabilities and suitability for leadership roles. This can result in women being overlooked for promotions, grants, and prestigious opportunities [4]. Furthermore, the academic environment itself often lacks supportive structures, such as mentorship programs and networks, which are crucial for career advancement. Balancing work and family responsibilities can also be a significant challenge for women in academia, as they often face societal expectations and traditional gender roles that place a heavier burden on them [5,6]. This can lead to career interruptions and limited availability for research and professional development. Additionally, the lack of diversity in decision-making bodies and the scarcity of female role models in senior positions further perpetuate the underrepresentation of women in academia. To address these challenges and promote gender equity, institutions must actively work towards dismantling biases, implementing supportive policies, providing mentorship and sponsorship opportunities, and fostering inclusive and flexible academic cultures that enable women to thrive and progress to senior levels.

II. THEORITICAL FRAMEWORK

The underrepresentation of women in scientific positions, particularly in high-ranking roles such as editorial boards, is a

well-documented phenomenon [7]. Extensive literature examines the gender composition of editorial boards, focusing on various research domains. Notably, a study conducted in 2014 reported a substantial increase in the representation of women on the editorial board of Functional Ecology, with women comprising approximately 40% of the board in 2014, compared to nearly zero percent in 2004 [8]. The study further revealed that female editors exhibited a tendency to invite more female reviewers compared to their male counterparts. Intriguingly, the geographic location of the editors also influenced their selection of reviewers, as they showed a preference for reviewers from their own geographic region. Similarly, the presence of women academics on editorial boards in the field of medicine was found to be limited. Furthermore, an investigation into environmental science journals in 2015 revealed that out of the 100 journals analyzed, a mere 21.6% of the editors-in-chief were women. It was also observed that journals with lower journal impact factors (JIF) had a higher representation of women in editor-in-chief positions. Conversely, as the JIF increased, the proportion of women in these positions decreased [9]. Researchers argue that factors such as childbearing, family formation, gender expectations, and lifestyle choices contribute significantly to the observed gender gap in editorial boards [9,10, 11].

According to the Web of Science, an analysis of the Top 20 psychiatry journals ranked by Journal Impact Factor (JIF) in 2014 revealed that all editors-in-chief were men [12]. Notably, the prestigious journal Science had exclusively male editors-in-chief until 2009, when Marcia McNutt became the first woman to join the editorial board [12]. A comprehensive study examining 119 psychiatry journals listed in Clarivate Analytics' Journal Citation Reports (JCR) for 2017 found that women accounted for 30.4% of the editorial boards, a figure that remained consistent for editors-in-chief as well [13]. Further analysis focusing on medical journals in 2021 indicated that only 21% of editors-in-chief were women, with considerable variation across medical specialties [14]. In certain fields such as odontology, oral surgery, allergy, psychiatry, anesthesiology, and ophthalmology, no women held editor-in-chief positions, while specialties like primary health care, microbiology, genetics, and heredity witnessed higher proportions of women as editors-in-chief [14]. These findings strongly suggest the need for collaborative efforts among medical journals to increase the presence of women in editorial boards, as well as encouraging women's participation as publishers and authors. However, such initiatives require the active involvement of academic institutions. Pediatrics journals, for instance, exhibited low representation of women, with only 19.44% of editors-in-chief being female, and 33.05% of the editorial boards being comprised of women [15]. In examining the gender composition of editorial boards, it is noteworthy that both the IEEE Education Society's primary journals, Transactions on Learning Technologies and Transactions on Education, currently have female Editors-in-Chief. However, there is a stark contrast in the representation of women on their editorial boards, with the former having only 8% female members and the latter having 38%. This disparity highlights the ongoing challenges and progress in achieving gender parity within academic publishing. A recent study focusing on psychology and neuroscience revealed significant underrepresentation of women on editorial boards, with only 20% of editors being women in 76% of psychology journals, and 10% of the editorial boards being women in 88% of neuroscience journals [16]. Over time, there has been an increase in women's participation on medical editorial boards. In 1970, women accounted for just 1.4% of the editorial board, but by 2005, this proportion had risen by 14.6%. The study encompassed 16 major biomedical journals [17].

In the realm of mathematical journals, a comprehensive study encompassing 435 journals found that women occupied a mere 8.9% of editorial board positions [18]. The study further revealed that countries with a relatively higher representation of women on editorial boards included Canada (12.2%), France (11.7%), Australia (11.4%), and Italy (11.1%) [18]. In a broader investigation examining the participation of women in leadership positions in physics [19], various aspects such as directors, department chairs, Nobel Prize winners, and editors were analyzed. With regards to editors, it was noted that only two education journals, namely Physical Review Physical Education Research and The Physics Teacher, exhibited a greater number of women editors than men. Notably, a research survey conducted in 2005 by the Statistical Research Center of the American Institute of Physics involved 1,350 women physicists from over 70 countries, with 511 participants from the United States. The survey revealed that 60% of these women were inspired by a teacher to pursue a career in physics during their secondary school years. However, only 1.92% of the participants served as editors for any journal, with 1.25% being academics and 0.66% being non-academics [20]. The study reviewed the Top 50 journals in the field and highlighted the geographical representation of women editors, which demonstrated an imbalance with 60% of the editors hailing from the United States, followed by the United Kingdom and Spain [20].

The underrepresentation of women on editorial boards across various research fields is a well-established fact. Society's expectations for women to be nurturing and caregiving can hinder their advancement into leadership roles, which often require qualities associated with masculinity, such as assertiveness. Women face a double-bind dilemma, being judged as either too soft or too hard depending on their adherence to gender norms, reinforcing biases and limiting their leadership opportunities [21,22]. Empirical evidence indicates that women shoulder a disproportionate share of household responsibilities and childcare duties compared to men [19]. Despite the recognition of gender disparity on editorial boards, comprehensive information is lacking across research fields as existing studies tend to focus on specific domains. Efforts are now emerging to address this gender gap and increase the reporting of women's participation in science. Publishing directors and journal editorial teams are demonstrating increased awareness and commitment to closing the gender gap on their editorials [23, 24].

A collective effort involving 53 publishing organizations led to the creation of the Joint Commitment for Action on Inclusion and Diversity in Publishing in 2020, aiming to reduce bias in publishing activities [25]. Notably, publishers like Elsevier and the American Chemical Society have taken steps to quantify the representation of women in academia [25,26]. Elsevier journals now provide gender distribution and geographic location information about their editorial boards [27]. Nature journals have also prioritized increasing gender diversity among Editorial Board Members [28, 29]. These initiatives underscore the recognition that collaborative endeavors are essential for achieving any research goal. Given the limited availability of information pertaining to women's participation on editorial boards across various research fields, this study aims to investigate and shed light on the representation of women on the editorial boards of the top 100 journals within the aforementioned fields.

III. METHODOLOGY

Utilizing the Web of Science (WoS) database, this study employed a systematic approach to select the top 100 journals with the highest total citations in specific research fields, namely Engineering (ES), Medicine (MS), Social Sciences and Humanities (SSH), Law, Business and Economics (LBE), and Art (LA). Key information such as journal name, ISSN, category, citations, Journal Impact Factor (JIF) and 5-year impact factor reported in 2020 (5y JIM), JIF without self-citations, immediacy index, and quartile were extracted through an initial search. The field categorization was determined by applying a filter based on predefined metadata categories associated with a set of relevant keywords (Table 1). It is important to note that the category selection for Art required manual intervention as the keyword "art" generated additional categories such as artificial intelligence and particles and fields; thus, only the category "Art" was manually chosen. The data collected was exported to a CSV file, focusing on the top 100 journals for each of the five categories that provided information regarding their editorial boards from the reports exported by the WoS database, which encompasses the top 400 journals.

In instances where multiple quartiles were reported for a journal, the highest reported quartile was selected for analysis. Additionally, we gather information on the country and H-index of each journal from Scimago database. Extracting data from the official web pages of the editorial boards, the names and affiliations of women editors were collected. It is important to note that when a journal had numerous distinct groups of editors, the study concentrated solely on the three principal editorial board groups for each journal, namely the editor-in-chief, associate editors, and editors. For each woman editor, their H-index, last year of publication, and country affiliation were extracted from their Scopus author profiles. Notably, certain data such as JIF, quartile, 5y JIF, and JIF without self-citations for Art journals were unavailable on the Web of Science, resulting in their exclusion from the subsequent analysis phase.

To ensure simplicity and consistency in the statistical analysis, the 5-year Journal Impact Factor (5y-JIF) was chosen as the primary metric. Various journal metrics are available to assess the quality, impact, and productivity of a journal. Table 2 presents the Pearson Correlation Matrix, demonstrating the correlations among these metrics within the analyzed database. Notably, the Journal Impact Factor (JIF) in any form exhibited stronger correlations with other journal metrics. Consequently, the 5-year Journal Impact Factor (5y-JIF) was selected for subsequent statistical analysis, serving as a representative metric. Impact factors are highly dependent on research fields therefore, 5-year journal impact factor was normalized for each field [30]:

Normalized JIF = JIF / (Maximum JIF per research area)

Once the metric was selected, we performed descriptive and inferential statistics on data. The former includes summarizing and presenting the gender composition within editorial boards across different fields and the geographical distribution of female editors and editors-in-chief. The later includes a covariance and correlation between the normalized 5-year JIF and the percentage of female participation in editorial boards across different fields.

Table 1. Keywords to select the Top 100 research journals in five fields considered in this work.

Field	Keywords used in filter
Medical Sciences (MS)	Medicine, medical, clinical, physiology, medicinal, cell
Engineering Sciences (ES)	Engineering, computer, technology
Liberal Art (LA)	Art
Law-Business-Economics (LBE)	Law, legal, business, economics
Social sciences and Humanities (SSH)	Social, humanities, education

IV. RESULTS

The composition of editorial boards across the five research fields demonstrated gender disparity between male and female editors, particularly in leading positions (editor-in-chief) in LBE, MS and ES fields; the latter with only 14% of female participation. Figure 1 presents the gender composition within editorial boards of the Top 100 Research Journals according to their fields of study. For both, editors-in-chief (Fig. 1A) and editors in general (Fig. 1B), there is an increasing male participation and correspondingly decreasing female participation in the following order: LA, SSH, LBE, MS and ES. Considering the general editorial boards, while LA journals exhibited nearly equal participation of females and males, in ES journals exhibited a high gender disparity. The male editors

surpassed female editors by approximately four to one within the analyzed journals.

The global distribution of the Top 100 research journals is highly concentrated in only seven countries, with the primary contributors to ES being United Kingdom (38%), United States of America (35%), and the Netherlands (20%). Figure 2 illustrates the percentage distribution of the Top 100 research journals affiliated with publishers across various countries, within each research area examined. The United Kingdom emerges as a dominant force in ES, editing 38% of the journals in this field, as well as in LBE, where it accounts for 45% of the journals. Conversely, the United States of America exerts a significant influence in MS, with its journals representing 68% of the total, and in SSH, with 56% of the journals being edited by American institutions.

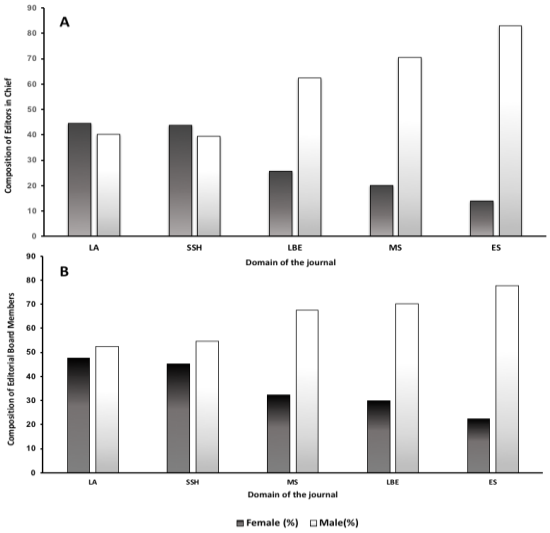

Figure 1. Gender composition of editorial boards (1A editor-in-chief and 1B editors) in the Top 100 Research Journals across disciplines: Engineering (ES), Medicine (MS), Social Sciences and Humanities (SSH), Law, Business and Economics (LBE), and Art (LA).

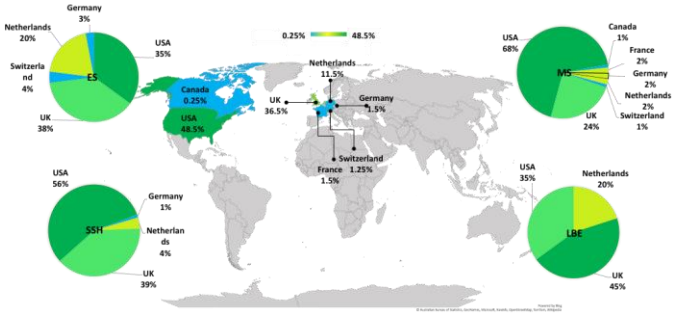

Figure 2. Map showing the percentage distribution of the Top 100 research journals affiliated with publishers in various countries. The pie chart also illustrates the distribution of journal affiliations by country across ES, MS, SSH and LBE research areas.

Table 2. Pearson Correlation Matrix among different metrics (WSC: Without Self Citations) for the Top 100 journals within the fields of Engineering (ES), Medicine (MS), Social Sciences and Humanities (SSH), Law, Business and Economics (LBE), and Art (LA).

Journal Metrics	Citations	H-index	Immediacy	2-year JIF 2020	2-year JIF 2020 WSC	5-year JIF 2020
Citations		0.878	0.678	0.772	0.767	0.758
H-index	0.878		0.652	0.836	0.836	0.839
Immediacy	0.678	0.652		0.846	0.846	0.835
2-year JIF 2020	0.772	0.836	0.846		0.999	0.991
2-year JIF 2020 WSC	0.767	0.836	0.846	0.999		0.991
5-year JIF 2020	0.758	0.839	0.835	0.991	0.991	
Average	0.770	0.808	0.771	0.888	0.888	0.883

The gender composition within the editorial boards of the Top 100 research journals highlights an underrepresentation of females in 80% of the participant countries. In Poland, where there is no female participation in editorial boards, 95.7% of all editors are male non-chief editors, while 4.3% are male editors-in-chief, each potentially working in different countries and journals. Italy emerges as the country with the highest female representation in editorial boards, accounting for 74.2% of the positions. Notably both, Poland and Italy, are represented among the Top 100 journals in the field of LA. When considering the countries' leading productivity in other research fields, such as the United States and the United Kingdom, their female participation aligns closely with the average among the analyzed journals. In the United States, for each female editor, there are 1.8 male editors, and for each female editor-in-chief, there are 6.3 male editors-in-chief. Similarly, in the United Kingdom, for each female editor, there are 1.7 male editors, and for each female editor-in-chief, there are 6.7 male editors-in-chief.

The concentration of top research journals in countries like the USA, UK, and Germany suggests a disparity in scientific and technological influence and resources. However, this might also reflect that the global scientific community is highly interconnected, with significant international collaboration. Furthermore, the contribution of female editors from emerging economies, indicate a shift towards more balanced representation. In any case, governments and international organizations must implement policies towards a more inclusive and globally representative scientific community.

The USA shows the highest percentage (44.58%) of female editors and editors-in-chief in the top 100 journals, highlighting its leading role in promoting gender diversity in high-impact research publications. Figure 3 illustrates the country affiliations of female editors in the Top 100 research journals based on the analyzed research fields. Notably, most female editors in these journals are affiliated with institutions in the United States (45%), followed by the United Kingdom (15%). Institutions from other countries around the world account for smaller percentages of female editor affiliations, each representing less than 5% of the total. This disparity highlights the unequal distribution of female representation across different countries, indicating the presence of the Science Divide phenomenon.

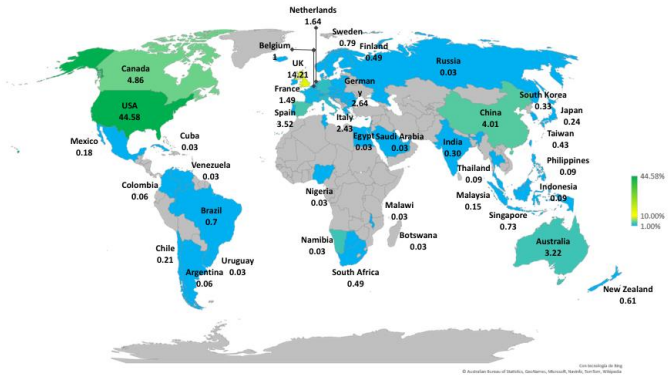

Figure 3. Country of affiliation of female editors and editors-in-chief in the Top 100 journals in five research fields according to Web of Science 2022 ranking.

The influence of female editors-in-chief on promoting gender equity within editorial boards appears to have a limited impact. Figure 4 presents the percentage of females in the editorial boards in relation to the number of female editors-in-chief across the Top 100 research journals analyzed in this study. A Pearson coefficient of 0.190 indicates a low positive correlation between these variables, which is statistically significant (p-value of 0.000). This suggests that while there is some association between the presence of female editors-in-chief and the overall gender composition of the editorial boards, the effect is relatively modest.

Female participation in the editorial boards impacts positively the 5-year JIF, as evidenced by the analysis of the Top 100 research, particularly within the field of Engineering Sciences (ES). Figure 5 illustrates the normalized 5-year JIF plotted against the percentage of female participation in the editorial boards, for different research fields SSH (Figure 5a), MS (Figure 5b), LBE (Figure 5c), and ES (Figure 5d).

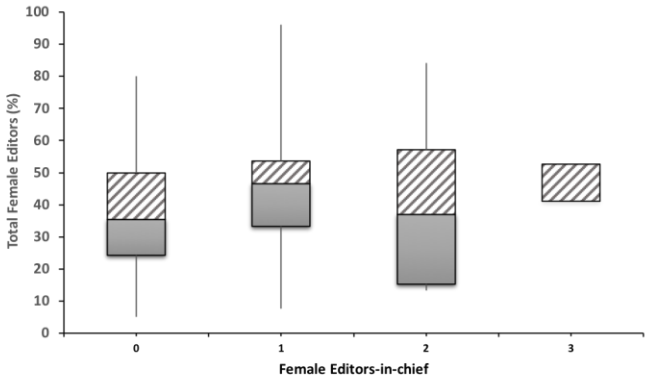

Figure 4. Percentage of females in the editorial boards in relation to the number of female editors-in-chief across the Top 100 research journals (Pearson correlation coefficient 0.190; p-value 0.000).

It demonstrates that as the female participation in the editorial boards increases, there is a corresponding increase in the 5-year JIF, particularly pronounced in MS, LBE, and ES. Besides the positive slope in the trendline shown in each figure, the covariance and correlation between the variables is not only positive but also statistically significant (as reported in Table 4). For instance, the correlation coefficient for ES is 0.564, statistically significant with p-value of 0.000, supporting the idea that diversity of talent, perspectives, education, and gender can benefit us all.

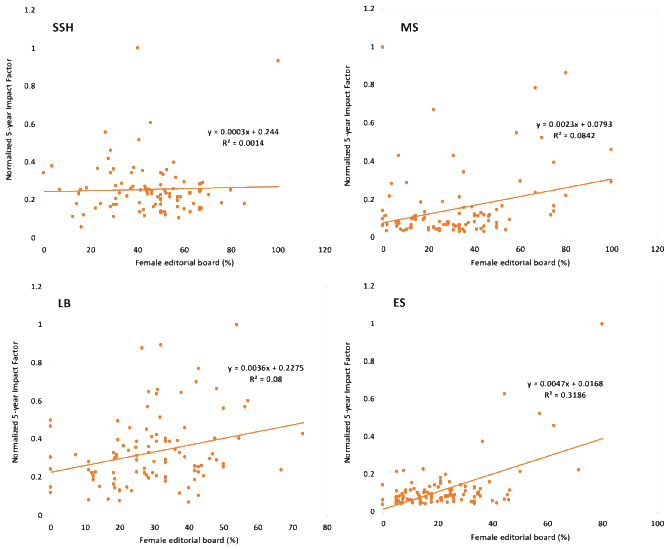

Figure 5. Normalized 5-year JIF versus percentage of female participation in editorial boards in the Top 100 journals in the 2020 ranking of the research fields: 6a Social Sciences and Humanities (SSH), 6b Medicine (MS), 6c Law, Business and Economics (LBE), and 6d Engineering (ES). Despite the large dispersion, the trendline is also added to highlight the benefits of including females in the editorial boards.

V. Discussion

According to the Global Gender Gap Report [31], the projected timeline to achieve gender equality stands at 132 years if current trends persist. However, the COVID-19 pandemic has significantly exacerbated this timeline, adding an additional 32 years to the projection reported in 2020. It is important to acknowledge that our database corresponds to 2020, and the current reality may present even greater challenges than the findings presented herein. Consequently, our research findings assume heightened significance in advocating for proactive measures to address the gender gap. Within each analyzed field of research, the gender composition of editorial boards demonstrates a predominant presence of males, with the most pronounced disparity observed in editor-in-chief positions, aligning with the findings of Ceci et al. [7]. Various factors, including childbearing, family formation, gender expectations, and lifestyle choices, have been identified as contributing to this gender gap in editorial boards, as mentioned previously [9,10,11].

The gender gap observed within the participation in editorial boards is more pronounced in developing countries, also related to the existence of a Science and Technology Disparity. As stated in the Global Gender Gap Report [31], the gender gap is relatively narrow in the education sector. However, in the realm of research publications, which closely aligns with education, a significant gender gap persists. The research editorial industry is intricately linked to scientific productivity, thereby complicating the achievement of gender parity in this sector when compared to fields such as health and education. Among the Top 100 journals in the research fields examined in this study, only seven countries are responsible for their editorial oversight: The United States of America, United Kingdom, the Netherlands, Germany, France, Switzerland, and Canada. Furthermore, when examining individual female editors, it becomes apparent that 60% of them are affiliated with institutions in the United States and the United Kingdom, while the remaining percentage is distributed among various countries with participation rates below 5%.

Table 4. Covariance and Correlation Coefficients for Normalized 5-year Journal Impact Factor (JIF) 2020 and the percentage of females in Editorial boards for the Top 100 Research Journals in different fields

Normalized 5-year JIF vs	**Social Sciences and Humanities (SSH)**	**Medicine (MS)**	**Law, Business and Economics (LBE)**	**Engineering (ES)**

female editors (%)				
Covariance	0.097	1.199	0.777	1.103
Person Correlation Coefficient	0.037	0.290	0.283	0.564
P-value	0.723	0.004	0.004	0.000

The impact of female editors-in-chief on promoting gender equity within editorial boards appears to have a limited influence. This finding contradicts the research conducted by Fox, Burns, and Meyer, who reported that female editors tended to invite more female reviewers compared to their male counterparts. This apparent discrepancy could be attributed to the differing roles and responsibilities of reviewers and editors, as well as the variation in sample scope between their study, which focused on Functional Ecology, and our broader database encompassing multiple research fields.

Furthermore, our analysis reveals a positive relationship between the participation of females in the editorial boards and the Journal Impact Factor (JIF) of the Top 100 journals, particularly evident in the field of Engineering Sciences (ES). This observation aligns with the findings of UNESCO's report by Chavatzia (2017) on girls' and women's education in science, technology, engineering, and mathematics (STEM) areas [32]. The UNESCO report highlights that globally, only 35% of STEM undergraduates are women, reinforcing the significance of our findings within the context of STEM fields.

Gender equality encompasses the equal representation of both males and females in all sectors, including the research editorial sector, rather than an exclusive focus on either gender. Differences in the socialization and value systems of men and women often lead to women perceiving fields like computer science and engineering as less welcoming or relevant to their interests. This perception, along with the underrepresentation of women in editorial leadership roles, perpetuates stereotypes and limits diverse perspectives in research. Increasing women's participation in these fields is crucial, not only to broaden the talent pool and close the gender pay gap but also to enhance the inclusivity and functionality of technological innovations [33]. It is recognized as a fundamental human right, ensuring equitable access to valuable resources, opportunities, and rewards. The United Nations emphasizes that gender disparities result in the underutilization of half of humanity's talent, impeding progress towards addressing global challenges and achieving the UN Sustainable Development Goals [32]. In the current era of artificial intelligence, the inclusion of diverse perspectives, particularly those of women, is essential. For example, AI applications, such as image generation tools, often default to male-centric outputs when depicting technological roles, reflecting and reinforcing existing biases. By ensuring women are actively involved in the development and oversight of AI technologies, we can create systems that are more representative and equitable.

To demonstrate the advantages of gender equality in the scientific publishing sector, Figure 6 depicts the Normalized 5-year Journal Impact Factor (5-year JIF) plotted against the percentage of female participation in two categories: (a) editor-in-chief and (b) editors in non-chief positions. The data exclude cases of 0% and 100% female participation. An ideal envelope function, encompassing 97% of the represented data, is also included. While data scarcity above 50% female participation limits further analysis, the proposed envelope functions indicate a mean of 50% with standard deviations of 18% for female editors-in-chief and 25% for female editors in non-chief positions. These functions serve as an upper limit within the current data, supporting the notion that collective efforts and policies promoting gender diversity can lead to improved outcomes. The discrepancy between the standard deviations may be attributed to a relatively better gender parity in non-chief editor positions. As gender parity improves, opportunities to enhance journal metrics increase, thereby narrowing the distribution and standard deviations of the Gaussian function. This discussion provides insight into potential future research directions, including an examination of male editors, other research fields (e.g., Basic Sciences), and the use of larger databases such as the top 400 journals.

VI. Conclusions

This study examined the gender composition of editorial boards in the Top 100 research journals across five distinct fields: Liberal Arts (LA), Social Sciences and Humanities (SSH), Medical Sciences (MS), Law, Business and Economics (LBE), and Engineering Sciences (ES), based on the 2020 Web of Science ranking. Our findings revealed a notable gender gap in these editorial boards, particularly in the context of editor-in-chief positions in Engineering, where there were four male editors per each female editor. Interestingly, an analysis of the presence of female editors-in-chief showed that their increased representation had very limited impact on the gender gap. This suggests that simply having more women in leadership roles is insufficient to achieve gender parity in the research editorial sector.

Furthermore, the study highlighted that the gender gap in the research in Engineering editorial sector is more severe in developing countries compared to other sectors such as health services and education. This observation can potentially be attributed to the Science Divide, as the productivity and knowledge generation in this sector heavily rely on scientific advancements and access to cutting-edge technologies.

Developing countries may face challenges in bridging this gap, which hinders gender equality in the research editorial sector.
The analysis also revealed a positive association between the metrics of the journals and the increasing participation of women in the editorial boards, particularly in the field of Engineering Sciences (ES). This finding aligns with the ongoing concerns raised by UNESCO regarding the underrepresentation of women in STEM areas, where their participation as aspirants, undergraduates, and labor force remains significantly lower compared to other fields.
The study emphasized the importance of gender parity and discussed its advantages using an envelope function. It served as an upper bound for the actual data, indicating that achieving equal participation of male and female editors is more likely to lead to improvements in the metrics of a journal. These findings underscore the significance of striving for gender equality in the research editorial sector in all the analyzed fields, but mainly in Engineering.

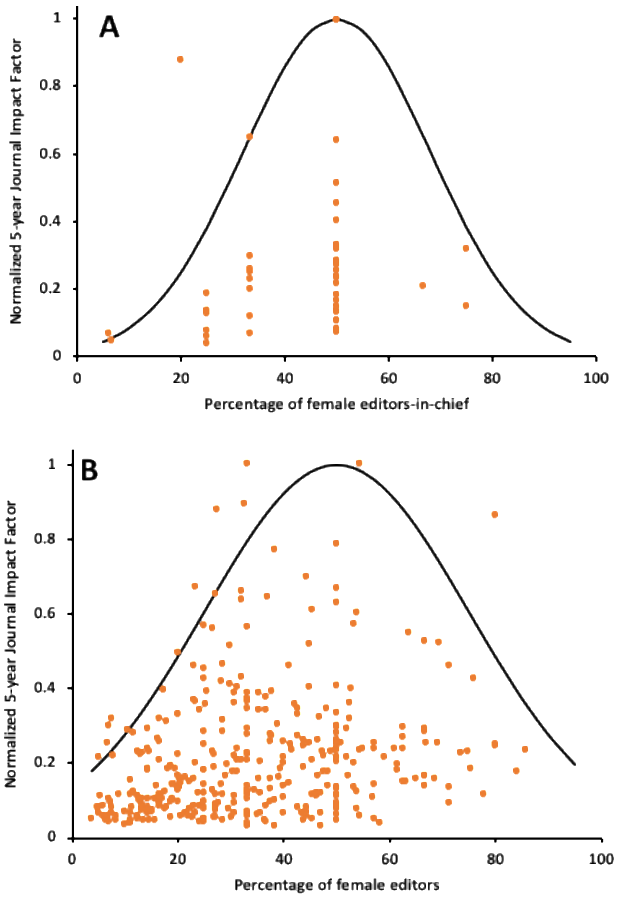

Figure 6. The relationship between the Normalized 5-year Journal Impact Factor (JIF) and the percentage of female participation was examined in two categories: (A) editors-in-chief and (B) editors in non-chief positions. Journals that did not demonstrate a commitment to gender parity, represented by 0% and 100% female participation, were excluded from the analysis. To provide a visual representation, an ideal envelope function encompassing 97% of the represented data was included, suggesting a potential improvement in the JIF with increased gender parity.

Addressing gender disparities in editorial boards promotes equity and inclusion within the academic community, with great benefits on Engineering education as evidenced along the study. This is not only a matter of human rights but also enhances the relevance of inclusive practices that can increase the quality and impact of research, and inspire future generations of researchers.

authors contribution
All authors have been involved in data extraction, analysis and drafting of the manuscript.
Competing interest
Authors declare no conflict of interest.

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