

WOMEN FACULTY AND SCIENTIFIC PRODUCTIVITY IN LATIN AMERICAN CONTEXT: EVIDENCE FROM CHILE

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Abstract

Since the 19th century, the position of women in the context of higher education has undergone multiple changes, although their incorporation has not been a simple or homogeneous task. Currently, women face new consequential challenges of a globalized world and the notion of market education that characterizes institutions nowadays. One of the great challenges is related to the under-representation of women in senior research positions (Aiston and Fo, 2020). In this context, new standards have been established to measure the productivity, quality, and effectiveness of teachers, specifically scientific productivity has been internalized as an indicator of professional progress, the type of publication, its impact, and the citation rates today. They have special relevance, where many times achieving high scientific productivity is very complex for academics who do not access the teaching staff early (Webber and Rogers, 2018). Furthermore, it is very difficult for academic women to maintain high levels of productivity constantly both at work and home (Lipton, 2020). In this sense, the principles that encourage academic productivity increase competition among teachers and reinforce gender inequalities together with a valuation of male professional life (Martínez, 2017). Indeed, the participation of women in sending articles is much lower than their male counterparts (Lerback and Hanson, 2017). Therefore, the present study aims to visualize the participation of Chilean academics in current productivity indices, based on the description of secondary data obtained from the DataCiencia and Scival platforms. The sample consists of 427 people, of which 17.3% were women, with an average of 10 publications for the year 2019. To achieve the objectives, the following strategy was developed: 1) describe and interpret the secondary data obtained during the year 2019 on each of the platforms. 2) Compare the data obtained to national averages and type of institution and gender. Based on the analyzes, the implications of female participation in the number of women observed at the national level and their position in international indicators and new lines of research are discussed.

Keywords: *Women, faculty, scientific productivity, higher education.*

1. Introduction

The expansion of higher education since the end of the last century has brought new transformations that lead to rationalization and organization of society and, at the same time, provides the basis for global integration and the modern service economy (Schofer et al., 2020).

In a scenario where academic capitalism has the participation of professors and researchers as entrepreneurs of intellectual capital, because it requires education and research to meet the needs of the labor market and the changing economy, deliver infrastructure and services to companies, and transferring knowledge that contributes to capital accumulation (Jessop, 2017).

Likewise, one of the main objectives of higher education is the creation of new knowledge through research and therefore the publications that are generated from it (Aithal and Kumar, 2017). In this scenario, higher education journals have become the most important repository of research results in higher education, since scientific articles represent the achievement and conclusion of a process to achieve their publication after being reviewed by pairs (Tight, 2018).

This expansion of the university manifests itself through the dialectical development between social achievement and commodification, since, on the one hand, capital needs the knowledge resulting from academic research to drive innovation and, on the other, it requires a highly skilled workforce. qualified (Allmer, 2019). In this context, not only universities but also the academic body have had to adapt to the expectations set by the market and demonstrate their value through productivity in research (Berheide et al., 2020). Indeed, in this scenario, there is an increase in the number of academics around the world, whose number went from 4 million in 1980 to 13.1 million in 2018, with the consequent increase in the

number of publications between those years from 0.65 million to 3.16 million respectively, among the countries with the highest productivity in the United States (To et al., 2020).

This new academic production results in more flexible, diverse, and complex research careers (Holzinger et al., 2018). However, women have been and continue to be under-represented in science, which can affect their quality and competitiveness in research (Astegiano et al., 2019).

Mayer and Rathmann (2018) point out from the results found that academic women research and publish with different patterns, that is, instead of sending articles to competitive journals, they may feel satisfied with the publication of less prestigious book chapters, a situation that in the long run can be configured as a disadvantage for their professional advancement, since peer-reviewed journals are considered in the academic progression. In general terms, different factors put researchers at a disadvantage, since they have fewer opportunities to become highly productive researchers (Besselaar and Sandström, 2017).

Consequently, men and women dedicated to research have different performances in the scientific publication process, as happens with international collaboration and with scientific productivity that is much lower in women compared to men, which hinders their professional development (Aksnes et al., 2019). The gender biases experienced by academic women not only have negative consequences for women but also for science. First, this bias affects female scientists who are underrepresented in higher education institutions, especially in the highest hierarchies (Cislak et al., 2018).

The results of a study by Agunis et al. (2018) suggest that researchers with consolidated careers can accumulate levels of productivity similar to their male peers, however, their productivity increases are more limited, therefore, it is observed in this research that women with consolidated research careers need Over-accumulate or do more - that is, gain more knowledge, build more networks, and spend more hours on research - to achieve the same level of results as their male counterparts.

Consequently, gender has an impact on the academic ranking, the role of researchers in research teams and networks, since women researchers tend to be in the lowest academic positions and have fewer leadership positions, which that negatively impact their performance (Besselaar and Sandström, 2017). Likewise, academics tend to allocate more hours of work with students, decreasing their dedication of time to research activities. With this distribution of time, women's academic career is harmed, since the academic system rewards research over publications (Bagilhole, 2019).

2. Design

The present study is exploratory and descriptive. Through the analysis of secondary data, we seek to elucidate the participation of Chilean authors in prestigious research concerning their male peers, different categories are considered such as number of publications, number of field citations, h-index.

3. Objectives

The purpose of this research is to describe the participation of Chilean academic women in high-quality research and at the same time to make their situation visible with respect to their male peers. To this end, work has been done through the analysis of secondary data on the scientific productivity of Chilean researchers with the highest number of indexed publications.

To fulfill the objective, first, descriptive statistics (means, standard deviations, etc.) are obtained for each of the variables according to the sex of the authors.

4. Methodology

Data acquisition and integration

The study data were obtained using two platforms: (1) SciVal (<https://www.scival.com/home>); and (2) DATACIENCIA (<https://dataciencia.anid.cl/>). From SciVal, the 500 authors with the highest scientific production in Chile were collected in a period from 2017 to 2019, this platform provides access to the research performance of different institutions and their associated researchers in total SciVal considers 231 countries around the world. Likewise, the DATACIENCIA platform collected 3,303 authors with Chilean affiliation in 2019. This platform provides the dimensions of the national scientific production by gender, institution, region, and publications.

Therefore, for the coding of the authors' gender, the data obtained in DATACIENCIA were manually matched with the top 500 authors with the highest production delivered by SciVal. Also, 2 additional criteria were used for data integration: having at least 3 publications per author and having the H index (an indicator of scientific production). Based on these requirements, the sample is made up of 427 authors with Chilean affiliations.

5. Data analysis

To characterize the sample, descriptive analyzes were carried out for the study variables (gender, type of institutions, number of publications, citations, weighted citations to the field, and H index).

The analyzes were carried out through the Statistical Package for the Social Sciences (SPSS) Version 25 program (IBM cor., 2017).

6. Results

The results show that the percentage of academic women (17.3%) is much lower than their male counterparts (82.7%). Descriptive statistics are presented in Table 1.

Regarding the number of publications reported for the year 2019 in the DataCiencia platform, it is observed that men present a higher average (12.9) than their female counterparts (9.6). Likewise, in the Scival platform, the academic production observed between the years 2017-2019 reflects that women present an average (33.12) while male authors present an average (41.24). Regarding the number of citations between the years 2017-2019, it is observed that male authors have a higher average (647) than women (501). However, about appointments in the field of application, the mean of men (1.9) does not present great differences for women (2.0) and finally, concerning the productivity indicator H index, women presented an average of 23.05 while men an average of 26.90 between the years 2017 and 2019. These results can also be explained because women in the samples correspond to less than a third of the number of men.

Table 1. Descriptive Statistics.

	<i>Women (N=74)</i>	<i>Men (N=353)</i>
<i>N° of publications of DataCiencia</i>		
Mean	9.59	12.95
Standard Deviation	11,7	17,2
Min-Max	3-102	3-109
<i>Academic Production at SciVal (2017- 2019)</i>		
Mean	33.12	41.24
Standard Deviation	25,97	46,52
Min-Max	21-238	20-338
<i>Citations</i>		
Mean	501,76	647,71
Standard Deviation	919,6	1297,8
Min-Max	43-7077	22-8140
<i>Citations in field of application</i>		
Mean	2,09	1.94
Standard Deviation	2,12	2,4
Min-Max	0-13	0-29
<i>Índice H</i>		
Mean	23,05	26.90
Standard Deviation	15,36	17,44
Min-Max	6-105	2-109

7. Discussion

The present exploratory study made visible that female academics with Chilean affiliation are underrepresented in prestigious research compared to their male peers, which reflects a similar proportion to the national reality where authors with Chilean affiliation represent (37%) of the universe compared to men considered active authors, who represent (63%) (DataCiencia, 2020).

In the results, mean differences are observed between the number of publications, where men present a greater number of published articles than women, although these differences did not undergo any statistical contrast test, it is worth mentioning that the evidence indicates that Men are frequently invited to participate as reviewers of prestigious journals, they have greater ease of access to key networks for production and promotion in the research career, such as a greater possibility of grants (Witteman et al., 2019; Hengel, 2017; Lerback and Hanson, 2017), which undoubtedly can influence the construction of research teams and subsequent scientific publications.

It is necessary to consider that the data worked on in this study contemplate a reality different from the current world scenario where the pandemic already has effects on scientific productivity, which shows

the difficulty for women where the systematic barriers they face combine and enhance (Oleschuk, 2020), since there is evidence in the international literature that shows gender differences in scientific production, as is the case with the study by Aksnes (2019) whose results show gender differences in international collaboration in research and the consequent concern about gender inequalities in science, due to the low level of productivity of female researchers.

On the other hand, the present study has some limitations to consider when interpreting its conclusions, the exploratory nature, as it is a study that only observes a particular year and did not work with a time series to see the evolution and behavior of the variables over a longer period.

8. Conclusions

The purpose of this research was to make visible the participation of women in high-impact research in a Chilean context, as well as to analyze the existence of gender differences in scientific productivity, with a much smaller number of female researchers than their male equivalents.

The results show that the authors with Chilean affiliation are underrepresented in prestigious research, it is observed that both in the data provided by DataCiencia for the year 2019 and in the data provided by Scival between 2017 and 2019 the number of articles published by women is inferior to their peers. The same occurs with the number of citations, men present a greater number and a higher H index.

Acknowledgments

The National Research and Development Agency (ANID) supported this work by the research grant Fondecyt Regular N° 1201517 “Women in higher university hierarchies: perceptions of their career and academic experience from their voices”.

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