A COMPARISON OF THE PROFESSIONAL PROFILE OF MEN AND WOMEN DEANS OF BRAZILIAN UNIVERSITIES

UMA COMPARAÇÃO DO PERFIL PROFISSIONAL DOS PRÓ-REITORES E PRÓ-REITORAS DAS UNIVERSIDADES BRASILEIRAS

UNA COMPARACIÓN DEL PERFIL PROFESIONAL DE VICERRECTORES Y VICERRECTORAS DE UNIVERSIDADES BRASILEÑAS

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Abstract

Women are underrepresented in positions of power and leadership in higher education and the challenges faced by women in order to reach these senior positions in academia are complex and have received considerable attention in recent years. In this work, we quantify gender diversity in Brazilian academia using three types of indicators: production of knowledge, temporal evolution in the career, and training of human resources to study in detail the profile of the Deans of Research and Graduate Studies in 215 Higher Education Institutions in the year of 2019. Our analysis shows that around only 36% of positions were occupied by women, a percentage that is not consistent with the number of women professors in Brazilian higher education. Using the National Council for Scientific and Technological Development (CNPq) Lattes' Platform databank, we show that men and women in dean positions publish roughly the same number of paper/scientific articles per year and present almost the same time elapsed in the career path, while women produce more human resources. The fact that women occupy only 1/3 of the positions of dean of research and graduation reveals that for women to reach the top, it is necessary that they adapt to the same metric intended for men while facing additional challenges indicating a persistent glass ceiling.
Keywords: gender; women in higher education; glass ceiling; academic leadership inequity.

Resumo

As mulheres estão sub-representadas em cargos de poder e liderança no ensino superior e os desafios enfrentados pelas mulheres para alcançar esses cargos superiores na academia são complexos e têm recebido atenção considerável nos últimos anos. Neste trabalho, quantificamos a diversidade de gênero na academia brasileira usando três tipos de indicadores: produção de conhecimento, evolução temporal na carreira e formação de recursos humanos para estudar detalhadamente o perfil das Pró-Reitorias de Pesquisa e Pós-Graduação em 215 Instituições de Ensino Superior no ano de 2019. Nossa análise mostra que apenas cerca de 36% dos cargos eram ocupados por mulheres, percentual que não condiz com o número de docentes mulheres no ensino superior brasileiro. Utilizando o banco de dados da Plataforma Lattes do Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), mostramos que homens e mulheres em cargos de pró-reitores publicam aproximadamente a mesma quantidade de artigos por ano e apresentam quase o mesmo tempo decorrido na carreira, enquanto as mulheres produzem mais recursos humanos. O fato de as mulheres ocuparem apenas 1/3 dos cargos de pró-reitora de pesquisa e graduação revela que, para que as mulheres cheguem ao topo, é necessário que se adaptem à mesma métrica destinada aos homens, enfrentando desafios adicionais que indicam um teto de vidro persistente.
Palavras-chave: gênero; mulheres no ensino superior; teto de vidro; desigualdade na liderança acadêmica.

Resumen

Las mujeres están subrepresentadas en puestos de poder y liderazgo en la educación superior y los desafíos que enfrentan las mujeres para lograr estos puestos más altos en la academia son complejos y han recibido una atención considerable en los últimos años. En este trabajo, cuantificamos la diversidad de género en la academia brasileña utilizando tres tipos de indicadores: producción de conocimiento, evolución temporal en la carrera y formación de recursos humanos para estudiar en detalle el perfil de los Vicerrectores de Investigación y Posgrado en 215 Instituciones de Educación Superior en 2019. Nuestro análisis muestra que solo alrededor del 36% de los puestos estaban ocupados por mujeres, porcentaje que no coincide con el número de profesoras en la educación superior brasileña. Usando la base de datos de la Plataforma Lattes del Consejo Nacional de Desarrollo Científico y Tecnológico (CNPq) mostramos que hombres y mujeres en cargos de vicerrectoría publican aproximadamente la misma cantidad de artículos por año y tienen casi el mismo tiempo transcurrido en sus carreras, pero las mujeres producen más recursos humanos. El hecho de que las mujeres ocupen solo 1/3 de los cargos de vicerrectoría de investigación y postgrado revela que, para que las mujeres lleguen a lo más altas, es necesario que se adapten a la misma métrica destinada a los hombres, enfrentando desafíos adicionales que indican un techo de cristal persistente.
Palabras clave: género; mujeres en la educación superior; techo de cristal; desigualdad en el liderazgo académico.

1 Introduction

Women are underrepresented in positions of power and leadership in almost all activities and this lack of women in senior positions has received considerable attention in recent years. In the business world, this has been studied extensively by companies that point out the economic harms of this underrepresentation (“A Global Imperative: Gender Equality in the C-Suite,” 2021; DIXON-FYLE et al., 2020; HUNT; LAYTON; PRINCE, 2015). In the academic career, this has also been increasingly researched (AREAS et al., 2020; BARBOSA et al., 2021). Despite this absence of women in higher and more prestigious positions, progress has been made. Today, in Brazil, women are already half of undergraduate (INEP, 2019), master's and PhD students (CAPES, 2021) and correspond to half of the workforce (BRASIL, 2018). A study by the editorial group Elsevier indicates that half of Brazilian publications have women in their authorship and these advances seem to indicate that the system is moving towards becoming more equitable (“Gender in the Global Research Landscape,” 2017).

Despite recognizing the importance of general advances, it is essential to emphasize that serious gender inequalities persist in education and science, with negative impacts on the country's social, scientific, and economic development, as indicated in studies on the subject. This ongoing gender gap faced by women goes beyond issues of morality or social justice. Other spheres would be positively impacted, starting with the economy itself, which could be strengthened with a more egalitarian participation based on the stimulation of female potential. Gender parity could help leverage around US$12 trillion to global GDP by the year 2025, according to a McKinsey Global Institute report (WOETZEL et al., 2015).

While the area of education can be understood as an overrepresentation of women because the workforce is traditionally composed of more women (AREAS et al., 2021), this does not translate into gender equity in the teaching profession. While women represent 95% of pre-primary teachers, and 59% of secondary education, when it comes to higher education institutions (HEIs), they are still a minority, representing around 47%, although in a slightly higher proportion compared to the world average that reaches 44% (OECD, 2021).

The noteworthy progress in levels of education seen within the increase of women with undergraduates and graduate degrees in recent decades has also increased the pool of educated female talent, however, women continue to face significant challenges in career

advancement and participation in the academic decision-making hierarchy. In the career path, women face different gender biases and encounter many social barriers, not only in the hiring process, but also in many other adjacent factors: in the way people refer to the professional by their first or last name, in the way laboratory instructions are formulated and the way scientific production is evaluated. Some of these barriers are often subtle and so much a part of the everyday way men and women relate to each other that they may not even be noticed (AHMAD, 2017; AREAS, 2019; BIRD, 2010; ROSA; DREW; CANAVAN, 2020; SCHIEBINGER, 1999).

Different terms and expressions are used in the literature to illustrate the situation of gender inequality and the underrepresentation of women: leaky pipeline, glass ceiling, firewall, horizontal and vertical segregation, among many others that try to capture the complex phenomena. The glass ceiling metaphor has been used since the late 1980s to describe the symbolic dimensions of the discriminatory processes that inhibit women and other groups from advancing to senior and executive management positions in organizations (BENDL; SCHMIDT, 2010).

While leaky pipeline describes the progressive disappearance of women as they advance usually depicted with scissors graphs (AHMAD, 2017; AREAS et al., 2020; BRINK; VAN DEN BRINK; BENSCHOP, 2012; LIMA, 2017; ROSS et al., 2022), 'cultural sexism' is used by Savigny (2014) to describe the “significant, invisible and normalizing barrier to women's progression in academia”. The author calculates that if the total number of teachers remains the same in the UK and if the rate of increase remains the same (0.75% per year), it will take more than 100 years for women to reach equal numbers (SAVIGNY, 2014, 2019).

The terms horizontal and vertical segregation are used to describe the unequal distribution of professionals according to sex in workspaces. Horizontal segregation indicates a higher proportion of one sex in some professional careers and in certain areas or sub-areas of knowledge (AREAS et al., 2021; LIMA, 2017; SCHIEBINGER, 1999). Professions considered feminine tend to be less valued in the labor market due to this segregation that also causes the inclusion of mechanisms that make career choices clearly segmented by gender. In Brazil, a noticeably clear example of this segregation occurs in relation to domestic services, which is configured as a branch of activity marked by asymmetry between men and women, since 92.4% are workers and only 7.6% of men perform this function (ESCOBAR; RIBEIRO; VIANA, 2020).

This horizontal segregation in the academic setting can be seen in different countries. In Brazil a persistent underrepresentation of women can be seen in certain areas of knowledge, study, and research, such as the STEM field, generally associated with more male characteristics (AREAS et al., 2021; LIMA, 2017; MOSCHKOVICH; ALMEIDA, 2015). Schiebinger describes this horizontal segregation in the academic setting in United States (USA) with a concentration of women in what are known as the "soft" sciences, which include the life and behavioral sciences, as well as social sciences, and where the salaries are lower. On the other hand, in the "hard" or physical sciences, where prestige and pay are higher, fewer women are seen. As a result, a "feminization" of certain fields can be seen, such as women's studies, which may cause a negative effect on their funding and status (SCHIEBINGER, 1999).

Vertical segregation, on the other hand, describes situations in which the proportion of one sex is very high at one point in the hierarchy and very low at another, within the same area, career, or profession. Generally, the proportion of women is higher in entry-level, less valued positions, and extremely low in the highest and most prestigious positions. While "glass ceiling" refers to the invisible barriers that would prevent a group of people from ascending to the highest positions in their careers (LIMA, 2017; MOSCHKOVICH; ALMEIDA, 2015) "firewall" refers to the systemic and dynamic forms of discrimination that make up the very structure of organizations and are everywhere (BENDL; SCHMIDT, 2010).

Findings of Moschkovich and Almeida corroborate this hypothesis of a vertical exclusion in Brazilians academic setting. The study analyzed whether the greater equality of access to PhD and the increase in the number of women professors would have translated into greater equality of access to the leadership positions within the scope of the State University of Campinas (Unicamp). The study revealed a gender disparity and women professors are more likely to be undergraduate coordinators, a lower-lever position. On the other hand, they are more excluded from more prestigious positions such as rector and university council. While men and women have similar numbers at the lowest level, the proportion of women professors is slightly lower than that of men at the intermediate level, around 40%, but significantly lower at the highest level, making up to only 26%. The research also shows that up until 2013, no woman had been provost and the first women professor to occupy one of the university's six deans positions did so only in 2006, 40 years after its creation. In the University Council, between 2002 and 2011, among the 151 professors who acted as counselors, only 22.5% were women (MOSCHKOVICH; ALMEIDA, 2015).

The lack of women in senior positions within the academia portrayed in this study has also been addressed by literature in other countries. As in Brazil, the differential in the career progression of women and men professors is a reality in the European Union. Recent research results show marked gender inequalities as women are not progressing at the same rate as men in their academic careers, especially regarding leadership positions: women made up only 24% of faculty members and 22% of the leaders of institutions in the higher education sector across the European Union (ROSA; DREW; CANAVAN, 2020).

A study showed comparable situation in the United Kingdom (UK), in 2014, where women in higher education made up 45% of the teaching staff, but they represented only 22% of faculty, 35% of vice-chancellors and pro-rectors (PVCs) and 20% of vice-chancellors. The study also discusses whether the still significant gender gap is a case of absent structure or agency for women and findings show that:

> (…) female academic managers are no less ambitious or likely to apply for a more senior management role than are their male counterparts. This implies that women's missing agency is not in itself an adequate explanation for their continued underrepresentation at the top of higher education. Instead, talented, and ambitious women may be disadvantaged by a number of structural factors associated with the recruitment and selection process for senior posts, including lack of external career capital, conservatism and homosociability (SHEPHERD, 2017).

In the USA, which also counts on the advancement of women in obtaining higher education degrees, at all levels, including PhD's, and in the educational workforce, analogous situation was found in different research and reports (BIRD, 2010; HILL et al., 2016) . It would be expected that women would also be occupying a large part of leadership positions in universities. But the reality is the same found in Brazil and women are still outside of academic leadership positions. There is an under representation of women among full professors, precisely those who exercise a large part of decision-making power, as well as having the advantage of being able to prioritize research.

In science, the scenario repeats itself. Despite the increase in the number of women present in research, when analyzing 5.5 million articles and 27.3 million authorship, it revealed that men produce a greater number of articles, 70%, they also hold more first authorship, 66% ("Gender in the Global Research Landscape," 2017). A very recent study published in the science journal Nature shows that this situation of the under-representation of women in science and faculty positions persists. This may be attributed to early discouragement among junior researchers once women are less likely to be recognized for their contributions being systematically left off the list of authors of scientific publications

and patents. Results of this study showed that when regarding a reasonably successful paper, with the criterion of being cited 25 times, women are about 20% less likely than men to end up on the author list, especially regarding authorship on pivotal work. This all contributes to the leaky pipeline with women dropping out of research at higher rates at each stage of their careers and consequently, less likely to advancing in their careers (ROSS et al., 2022).

A study carried out by the Parent in Science Movement revealed an under representation of Brazilian women in the recent ranking of the 100,000 most influential scientists in the world. Brazilian women represent only 11% of the "Top 100,000" ranking, which considers the career dataset, and only 18% of the "Top 2% - Single Year" category. This underrepresentation has a negative effect on women's careers development, especially for those in leadership positions by reducing their visibility which can potentially create a vicious circle. With a lower perceived academic performance women have less visibility, which in turn leads to more difficulties in increasing productivity (OLIVEIRA et al., 2021). A study on the relation between job level and productivity of Swedish researchers showed that underling gender productivity differences, such as structural and behavioral factors, obstruct women's academic careers, which can consequently lead to wasted talents (VAN DEN BESSELAAR; SANDSTRÖM, 2017).

The systemic labor deprivations faced by women in relation to men occur in practically all sectors of society: private initiative, public administration, and government, including politics. In 2017, Brazilian women occupied an inexpressive 10.5% of the Chamber of Deputies seats, lagging far behind the already very low world rate, 23.6%. The situation repeats itself within strategic government positions and among the 28 ministers of state, only two were women, one of whom was effectively a minister, of Human Rights, and the other only had ministerial status, holding the position of Attorney General of the Union (BRASIL, 2018).

Comparable to what happens in the academic environment, Brazilian public administration has a workforce composed of almost 50% of women, however, this expressive representation also does not translate into the occupation of positions of power and leadership (FERRARI et al., 2018; MCINTOSH et al., 2012; MOSCHKOVICH; ALMEIDA, 2015; OLIVEIRA et al., 2021; VALENTOVA et al., 2017). In the most prestigious positions of the Brazilian Federal Public Administration (APF), those of leadership and advisory, known as Direction and Superior Advisory (DAS), a glass ceiling is also seen. Currently, women make up 43% of the total of these positions, in contrast, the situation observed in the highest levels,

DAS levels 4 to 6, they add up to only 33%, showing that women's access to these positions is still unequal (FIRMINO; SILVA, 2015).

The presence of women is even lower when it comes to the highest level, DAS 6, and women constitute only 19%, proving that access opportunities and their rates decrease as they reach higher and more restricted positions. This situation is aggravated by the fact that it means not only a difference in remuneration, but also in the prestige and status achieved, since there is a significant difference in the attributions and responsibilities of the position (AREAS et al., 2021; BRASIL; IPEA, 2012; ESCOBAR; RIBEIRO; VIANA, 2020). This disparity in access to the highest positions still occurs even though 48% of women have higher levels of education (FIRMINO; SILVA, 2015).

Gender and race are the main markers of difference in public administration and are decisive factors in insertion in the labor market and income per hour worked. When considering the universe of people with 12 years or more of education, gender was the key factor. That is, even with better levels of education, women still face difficulties to ascend professionally. This also shows how the public sector is more resistant to the professional advancement of women than large private companies (FIRMINO; SILVA, 2015). An additional aggravating factor to the gender difference in employability levels is education. The lower the level of education, the less likely women are to be employed (ESCOBAR; RIBEIRO; VIANA, 2020).

The challenges faced by women in order to reach leadership positions in academic settings are complex and have been researched from different perspectives in different areas of knowledge (AREAS et al., 2020, 2021; BARBOSA et al., 2021; BEATTIE, 2018; FERRARI et al., 2018; HILL et al., 2016; HOWE-WALSH et al., 2017; LIMA, 2017; MOSCHKOVICH; ALMEIDA, 2015; SHEPHERD, 2017; VALENTOVA et al., 2017; WALDMAN et al., 2018). Authors have identified a range of factors that act as barriers to women working in higher education: the impact of formal and informal gendered practices, as well as gendered institutional cultures (ACKER, 1990; BENSCHOP; VERLOO, 2011; BIRD, 2010; BRINK; VAN DEN BRINK; BENSCHOP, 2012; CHAPPELL, 2006; CHAPPELL; WAYLEN, 2013; MOSS-RACUSIN et al., 2012; ROSA; CLAVERO, 2022) caring responsibilities (HIRATA, 2019; LUIZA HEILBORN; RODRIGUES, 2018; STANISCUASKI et al., 2021); maternity (AHMAD, 2017; MACHADO et al., 2019; ROSA; CLAVERO, 2022; STANISCUASKI et al., 2021), as well as harassment (BRITO et al., 2022; SCHIEBINGER, 1999).

The current configuration of the work organization process, which is structurally androcentric, and the disparity in the use of time between men and women segregates and excludes women in the most diverse ways, devaluing their work and creating additional obstacles to their insertion in fields of knowledge and careers. Even today, it is possible to see the social roles assigned to men and women and the sexual division of labor regarding the role of caring for the home, children and family is still it is naturalized as a female role, which ends up overloading woman. This adversity, not always obvious, translates, for example, into the double (or sometimes even triple) weekly work shift undertaken by many women (AREAS et al., 2021). Brazilian women dedicated an average of 18.2 hours per week on homecare and/or childcare, while men spent almost half that time, on average, only 10.3 hours per week (BRASIL, 2018). This disparity is repeated even when women have a paid occupation, when they are heads of family and even when they receive a higher income (BRASIL, 2018; BRASIL; IPEA, 2012; MOSCHKOVICH; ALMEIDA, 2015).

Literature has shown the relation between motherhood and the maintenance or advancement of women's careers and how its consequences can create challenges (AHMAD, 2017; HILL et al., 2016b; HOWE-WALSH et al., 2017; MACHADO et al., 2019; ROSA; CLAVERO, 2022; STANISCUASKI et al., 2021). For Staniscuaski et al., “the impact of motherhood on women’s careers, concluded that the effect of children on women’s academic careers is so remarkable that it eclipses other factors contributing to women’s underrepresentation in science” (STANISCUASKI et al., 2021). In a survey led by the Parent in Science movement, findings showed that 81% of women scientists considered that motherhood had a negative impact on their scientific career (MACHADO et al., 2019).

Additionally, wage inequality is also still a persistent and universal problem faced by women. Despite considerable progress made by women in education and higher rates of women in the labor market in many countries, closing the gender pay gap remains a reality. According to UN Women data, the average salary of women is lower than that of men in almost all the countries in the world, and the situation is repeated in all levels of education, age groups, and in all sectors of work and it will take around 250 years to reach economic gender parity if it continues at this pace (UN WOMEN, 2020). In Brazil, recent studies have shown that, in general, men's monthly income is almost 20% higher than that of women. But once again the situation is aggravated when considering 12 years or more of education and men's monthly income is 32.5% higher (ESCOBAR; RIBEIRO; VIANA, 2020).

Science and education, which lead to advances and discoveries, are two of the main structures on which modern societies are based on and result in guiding norms, behaviors and actions that influence societal dynamics. An analysis of the distribution of power in these fields can also reflect an analysis of the distribution of power in the social field, in which we can say that the opposite is also valid (AREAS; SANTANA, 2020; LIMA, 2017). Schiebinger describes the space for women to build a career inside or outside academic life as limited and this restricted access to a scientific career occurs, among other reasons, due to a social structure around male interests and power: “attitudes toward gender are not peripheral to science but structure key aspects of both the institutions in which science is produced and the knowledge issuing from those institutions” (SCHIEBINGER, 1999).

The instruments of domination identified by Pierre Bourdieu, as well as its theoretical framework, have been used in the literature to explore the multidimensional nature of power and leadership in a higher education environment (AREAS, 2019; AREAS et al., 2021; AREAS; SANTANA, 2020; BEATTIE, 2018; LETA; MARTINS, 2008; LIMA, 2017). Bourdieu’ theory of symbolic fields refers to autonomous fields that are understood as social spaces of domination and conflict, with their own rules and hierarchical structures. Far from being a purely epistemological process, the field is a product of the social factor coexisting with a diverse set of interests, conflicts, needs for legitimation and domination.

Scientific capital is described by Bourdieu as a particular kind of symbolic capital, which is founded on the acts of knowledge and recognition, and consists of the recognition, or credit, attributed by the set of peers-competitors within the scientific field (BOURDIEU; CATANI, 2004):

> As a system of objective relations between positions already won (in previous struggles), the scientific field is the locus of a competitive struggle, in which the specific issue at stake is the monopoly of scientific authority, defined inseparably as technical capacity and social power, or, to put it another way, the monopoly of scientific competence, in the sense of a particular agent’s socially recognized capacity to speak and act legitimately (i.e. in an authorized and authoritative way) in scientific matters (…) Because all scientific practices are directed towards the acquisition of scientific authority (prestige, recognition, fame, etc.), intrinsically two-fold stakes, what is generally called “interest” in a particular scientific activity (a discipline, a branch of that discipline, a method) is always two-sided; and so are the strategies tending to bring about the satisfaction of that interest (BOURDIEU, 1975).

A study published by Leta and Martins, in 2008, on the scientific capital of women and men showed that of the 42 units in which Universidade Federal do Rio de Janeiro (UFRJ)

is divided into, only 16 were headed by women, and of these, the majority belong the areas of the humanities, which are historically less targeted and prestigious. Considering the complexity of factors involved in gender relations in academia, they pointed out the imperative need to deepen research for more and better elements that can explain the "naturalized preferences" of women for certain areas, as well as for less prestigious positions in the academic environment and addressed the persistent blindness to sexism in academia that could still impact future generations (LETA; MARTINS, 2008).

In this work we examined the profile of 222 Brazilian Deans of Research and Graduate Studies during the year of 2019. Bringing Bourdieu's discussion and reflection into the issue of gender relations in higher education and science, we seek to understand if the reasons for the continued underrepresentation of women at senior leadership levels in academic settings is the lack of equality, translated into stricter rules for women, or in the lack of equity, a situation in which women who reach leadership positions comply with the same rules as men, which are incompatible with many other aspects of the dynamics of women's lives.

2 Materials and methods

We examined the profile and distribution of both sexes of Deans of Research and Graduate Studies from 215 Higher Education Institutions (HEIs) during the year of 2019. Data were requested from the Forum of Deans of Research and Graduate Programs (FOPROP). An electronic spreadsheet provided by FOPROP in Excel indicated the name of each of the Deans and their respective HEI information. The spreadsheet contained, in total, data referring to 244 institutions affiliated to FOPROP, among them: federal universities, state universities, federal institutes, university centers, colleges, private universities, municipal universities, in addition to institutes and research centers that have postgraduate studies.

Initially, we carried out an internet search to confirm that the names provided were correct and that the people indicated held the position during the period studied. For this, we consulted the websites of universities and institutions, as well as documents published in the Brazilian Federal Register (Diário Oficial da União in Portuguese). In this initial analysis, it was not possible to verify the deans of twenty institutions through the website or official documents. We contacted these HEIs by email and eleven institutions did not respond and, therefore, were excluded from the analysis.

Additionally, we excluded adjuncts and deputy deans, as well as those who did not occupy a position equivalent to a dean. Another seven institutions have two different deans, one for research and another for graduate studies, instead of just one, as is in most cases. The positions of these seven institutions were then considered individually. The spreadsheet also contained repeated data from three institutions that were excluded. Therefore, the final number of deans analyzed is 222.

We then proceeded to stratify the deans by sex. The first names were labeled manually, considering that in Brazilian culture first names are commonly gender specific. In the case of unusual first names, an internet search was carried out on websites such as Google Scholar, Curriculum Lattes platform, Research Gate, LinkedIn, institutional and university websites, to confirm the researcher's gender identity.

A more extensive survey was then carried out. The information was extracted through Curriculum Vitae Lattes (CV) on Lattes Platform during the year 2020 and the initial months of 2021. The platform is a virtual curriculum system created and maintained by the National Council for Scientific and Technological Development (CNPq), through which it integrates a database of data from curricula, research groups and institutions in a single information system, in the areas of Science and Technology, in operation in Brazil.

As the object of study is the general profile of deans and how much time they take to reach the peak of their career, we chose not to analyze those who do not have a PhD. Another nine professors were excluded, five of whom were men and four, women, from the following institutions. Additionally, a dean with a PhD was excluded because he did not have a CV registered on the Lattes Platform.

The information extracted from the CV of each professor and computed into an Excel spreadsheet is the following:

- year of graduation, specialization, master’s, and PhD completion.
- total number of complete papers/journal articles published in scientific journals.
- total number of books published or organized.
- total number of book chapters published.
- total number of participations in examining boards, including undergraduate, master's, and PhD.
- total number of supervised undergraduate students.

- total number of undergraduate students supervised in the Scientific Initiation Program (SI)[1].
- total number of supervised master's students.
- total number of supervised PhD students.

We calculated the mean and standard deviation of the years elapsed between undergraduate and master's; master's and PhD; undergraduate and PhD; undergraduate and position; masters and position; and PhD and position. In addition, we calculated the mean and standard deviation of the number of papers/scientific articles published; number of organized books and book chapters, work presentations, participation in an examination board including undergraduate, master's, and PhD; as well as the number of undergraduate students (including the SI), specialization, master's and PhD supervised.

We carried out an additional analysis of 14 higher education institutions to verify if the profile, trajectory of women and the distribution broken down by sex were maintained. The sample included the following HEIs: Federal University of Ceará (UFC), Paulista State University (Unesp), University of São Paulo (USP), Federal University of Rio Grande do Sul (UFRGS), Federal University of Minas Gerais (UFMG) , Federal University of Paraná (UFPR), Federal University of Goiás (UFG), Federal University of Bahia (UFBA), Federal University of Santa Catarina (UFSC), Federal University of Rio de Janeiro (UFRJ), Federal University of Pernambuco (UFPE), University of Brasília (UnB), State University of Campinas (Unicamp) and Federal University of São Carlos (UFSCar). This analysis included 16 deans in total, since two HEIs have two different deans each, one for research and the other for graduate studies, instead of just one: UFRGS and Unesp.

Data from the two groups, universe (Universe, group 1, n = 222), and selected institutions (Selected, group 2, n = 16), were then analyzed using the descriptive statistics tool known as boxplot (or box-and-whisker plot). The boxplot graphically shows statistical elements of a set of numerical data and indicate the measures of central tendency and the degree of dispersion and asymmetry of the data set as it visually displays the representation of five numbers: minimum, first quartile, median, third quartile and maximum (DUTOIT, 1986; TEAM, 2021). In addition to the rectangular box constructed so that its limits represent the first and third quartiles of the data set and the inner trace represents its median, the boxplot

[1] Scientific Initiation" (SI) is a program offered by the National Council for Scientific and Technological Development (CNPq) one of the Brazil's main research funding agencies. It offers scholarships that are distributed among professors at the universities, and they select the undergraduate students who will work in their research projects. The students who receive this scholarship are referred to as SI students (FERRARI et al., 2018).

has a straight line, the so-called whisker, that extends longitudinally from the box, indicating the variability beyond the first quartile (lower quartile) and the third quartile (upper quartile) (ROSS, 2004) . Meanwhile, outliers are records that differ significantly from their respective dataset and appear on the graph as individual points beyond the whisker limits (TUKEY, 1977).

3 Results

In this section we show the distribution by sex and categorize the profile of Deans of Research and Graduate Studies. We analyzed the trajectory of women until they reached the position compared to men, of the years elapsed between the obtained degrees, undergraduate, masters and PhD, as well as in relation to the occupation of the position in 2019. We also compared indicators between men and women regarding the production and publication of papers and scientific articles, books and book chapters organized; work presentations; participation in examining boards including undergraduate, master's, PhD; as well as the number of supervisions of undergraduate, Scientific Initiation Program, specialization, master's, and PhD students. Our analysis was separated into three types of indicators: production of knowledge, temporal evolution in the career and training of human resources.

The indicators studied are separated into two groups: universe - all the HEIs analyzed, made up of 215 institutions and 222 professors; and selected - 14 selected universities with 16 professors. In the lower part of the graphs, the vertical line points to the lowest values, the upper part to the highest values, and the rectangle is divided into three parts: the first quartile, the second quartile, which has the median, and the third quartile.

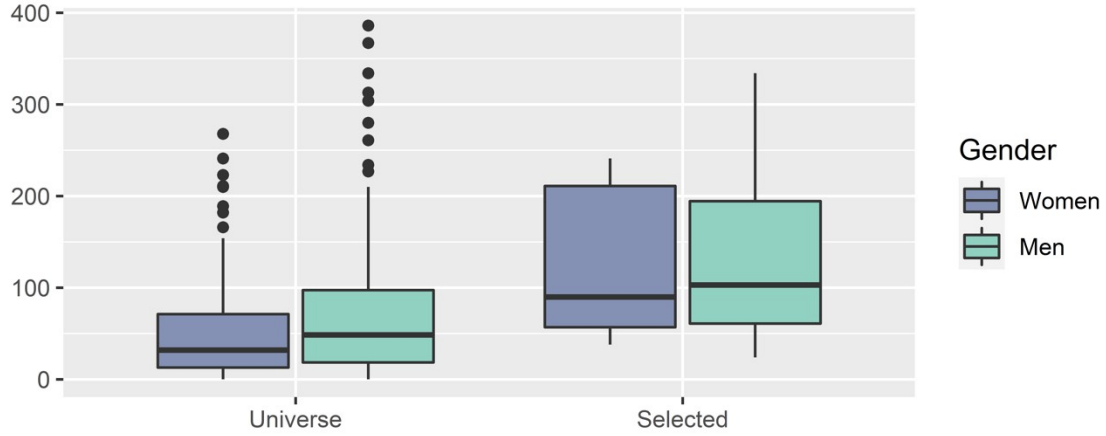
The results of the analysis of the distribution by sex of universe showed us a huge discrepancy regarding the number of women occupying the positions: only 82 women professors, while the number of men reached 140. This is equivalent to a representation of as little as 36.93% of positions occupied by women. When we analyzed the group of 14 selected universities, composed of five women and eleven men, we found that the percentage of women is even lower, representing only 31.25% occupying the positions.

This percentage of around 36% women as deans is related to the low percentage of women with the Research Scholarship (PQ) from CNPq (AREAS; BARBOSA; SANTANA, 2019), of women members of the Brazilian Academy of Sciences (VALENTOVA et al., 2017) and of women professors in positions of postgraduate coordination's, directors of

faculties and institutes, provosts and deans, as well as members of university council of Unicamp (MOSCHKOVICH; ALMEIDA, 2015). This numerical coincidence reflects a glass ceiling, a limiting factor for the advancement of women in the career, even when women represent half of PhD students and almost half of HEI professors in Brazil.

We first compared indicators of knowledge production. Chart 1 illustrates the distribution of the total number of papers/scientific articles published by women (blue) and men (green) Deans of Research and Graduation Programs with all the HEI in the left (Universe) and selected universities at the right (Selected). The solid line represents the data median and the region below the first quartile and the line above the third quartile. We found that there was a small difference when we compared the publication of papers and scientific articles, as shown in Chart 1, between women and men, in both groups, Universe and Selected. We observed, however, a significant difference between who publishes more and who publishes less, and this is due to several complementary factors: deans coming from different areas with different publication standards, the profile of the person who assumes this type of position is not necessarily a person who preferentially dedicates himself/herself to research but may be an academic who also dedicates himself/herself to other activities related to the university, including administrative ones.

Chart 1 - Number of papers/scientific articles published by deans.



Source: Elaborated by the authors with data from Lattes Platform.

In Chart 1, the first group, Universe, has very close medians of women and men: 32 and 48.5 respectively. The second group, Selected, has a slightly higher median publication of articles when compared to the first group, women – 90 and men – 103, possibly because the sample includes only cutting-edge universities. The difference between men and women in

this second group is also small when compared to the data dispersion. Another factor that also draws attention in this chart is a greater number of outliers, that is, people who publish a higher number of papers/scientific articles that differs from the productivity of the rest of the group. The number of publications of these outliers is higher in the case of men in the Universe group, which can possibly be explained by the fact that men have a more regular career and form larger collaborative networks than women researchers (AHMAD, 2017; BENSCHOP; VERLOO, 2011; BIRD, 2010; BRINK; VAN DEN BRINK; BENSCHOP, 2012; HOWE-WALSH; TURNBULL, 2016; WIECZOREK-SZYMAŃSKA, 2020).

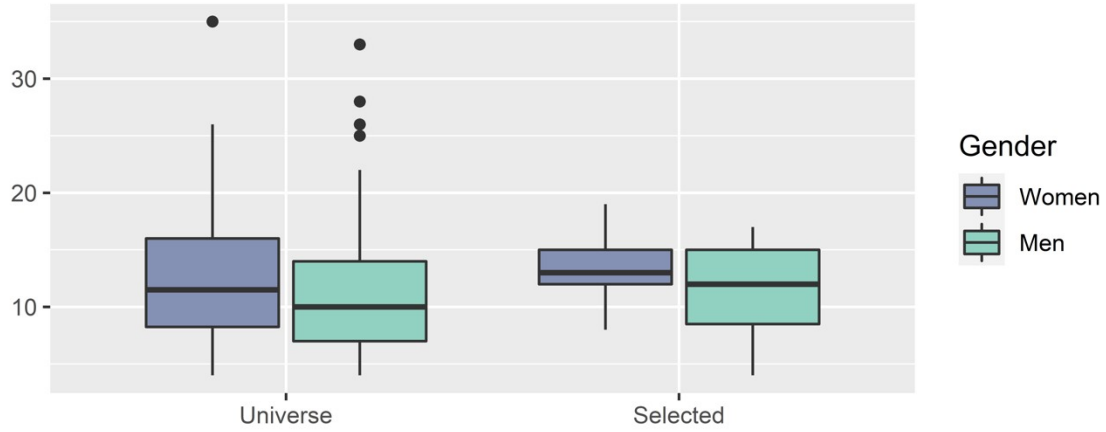
The result of the analysis of the number of papers published seems to indicate that there is not an expressive difference between the number of publications by men and women who reach this position. A study on CNPq's Research Scholarship grantees (PQ) in physics reached the same result (ARENZON et al., 2013). Although the profiles of men and women deans and PQ fellows are the same in terms of number of papers and scientific articles published, this does not mean that, in general, men and women have the same profile of publications. As it happens with the occupation of a dean's position, a PQ grant not only represents an important indicator of prestige in the academic and scientific career, but it also represents the gain of scientific capital, in the sense coined by Bourdieu (1975). It promotes visibility and recognition in the scientific community while providing researchers with a series of new accumulations and other opportunities, such as participation in advisory and judgment committees (FERRARI et al., 2018).

Recent studies carried out by the Parent in Science group adds data to an existing literature that shows that the unbalanced division of domestic work and motherhood, among so many other factors closely related to gender, have a significant impact on women's scientific and academic careers creating additional barriers and challenges (MACHADO et al., 2019; OLIVEIRA et al., 2021; STANISCUASKI et al., 2021). We can conclude that, somehow, the women who reach these leadership positions are only those who manage to overcome these additional obstacles not faced by men.

Two other indicators of academic production analyzed were the number of books and book chapters organized and the number of works presented. In both cases, the medians are remarkably close in both groups showing us that when these two indicators are added to the number of articles published the profile of men and women in the dean's position are not very different regarding academic production.

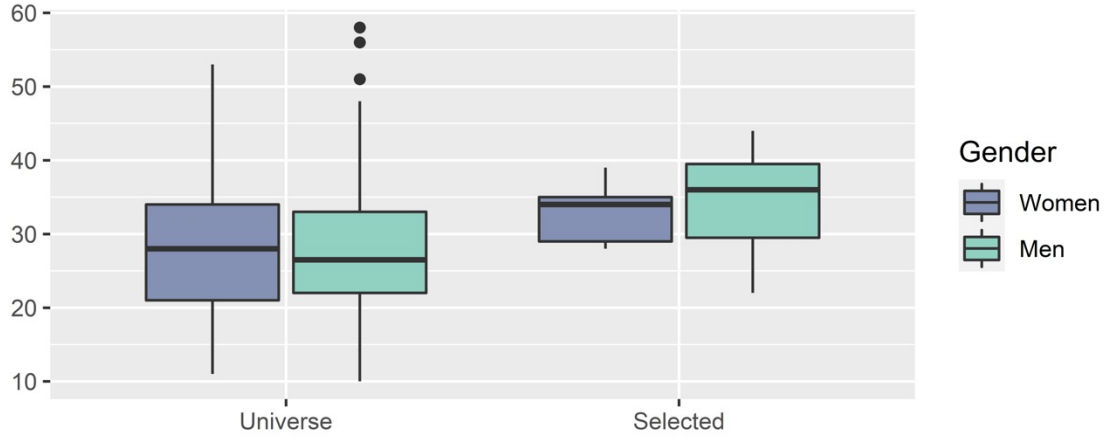
To understand how this process of overcoming obstacles takes place, we analyzed the time elapsed in years dedicated to obtaining degrees, as well as from these to the occupation of the position in the year de 2019. The time elapsed between undergraduate degree and PhD awarded (Chart 2); undergraduate degree and position in 2019 (Chart 3); and PhD awarded and position in 2019 (Chart 4) also show a small difference in the average time of these intervals when comparing men and women, but this small difference, once again, can be despised when compared to the dispersion presented.

Chart 2 - Time elapsed between undergraduates' degree and PhD.



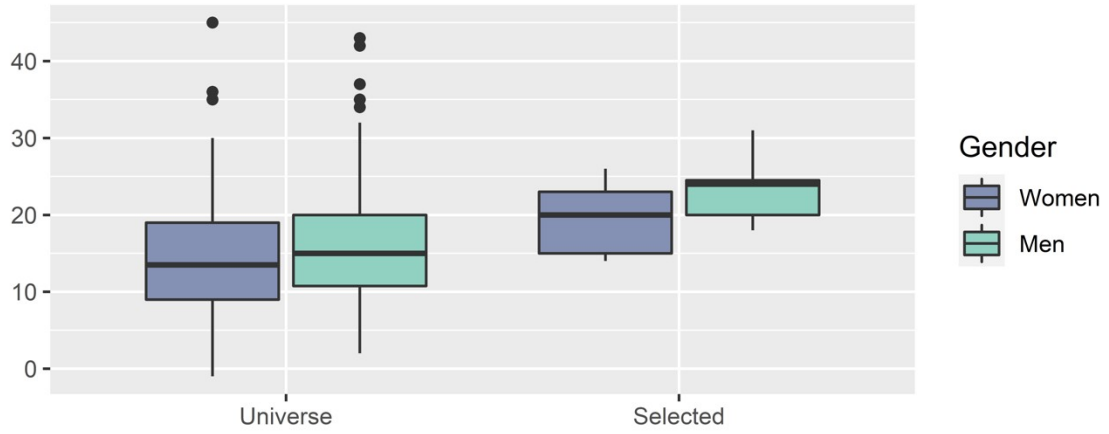
Source: Elaborated by the authors with data from Lattes Platform.

Chart 3 - Time elapsed between undergraduates' degree and deans' position in 2019.



Source: Elaborated by the authors with data from Lattes Platform.

Chart 4 - Time elapsed between PhD awarded and deans' position in 2019.



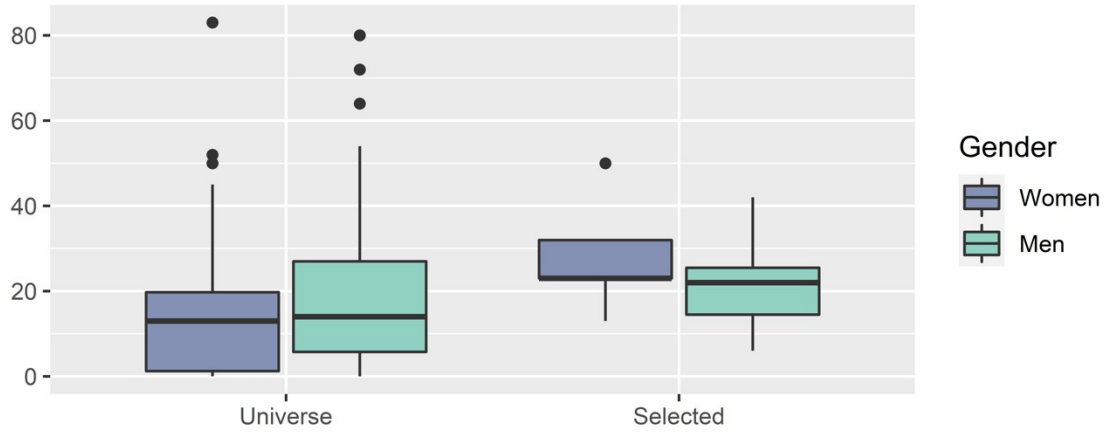
Source: Elaborated by the authors with data from Lattes Platform.

The difference observed between the indicators of career time when comparing men and women is, however, a surprising finding in this study. In the corporate world, where larger attention has been given to gender equity, it is already clear that women reach positions of power at an older age than men, which can be attributed to motherhood and domestic activities due to traditional gender roles. A recent study reveals the still-present gender gap and the barriers that hinder the presence and/or delay the advancement of women in high-level positions: 73% of women reported taking a leave of absence or deferring career advancement to meet family needs, while only 42% of men made the same choice. In addition, nearly half of the women noted that "cultural gender expectations" were an obstacle, while an unimpressive 2% of men reported having this perception. Another factor of concern for women in leadership is that for some positions there is an actual or expected age limit in the community which leads to an exclusion of these women from reaching the top ("A Global Imperative: Gender Equality in the C-Suite," 2021). The lack of gender lens in the career path can possibly create situations in which women only reach the top-level positions if motherhood and homecare do not cause a negative impact in their productivity, indicating that, maybe, only women with a network of helpers are able to reach these positions.

Finally, we evaluated the indicators of human resources training, that is, the supervision of students. The medians found in the total number of supervisions of master's

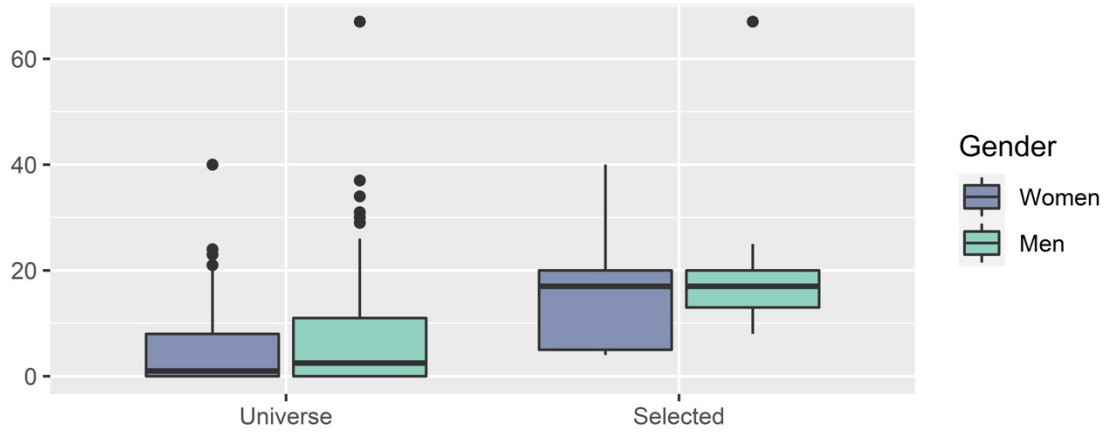
students as shown in Chart 5, and in the total number of supervisions of PhD students, in Chart 6, are roughly the same. This indicates that men and women professors produce basically the same amount human resources in when it comes to these postgraduate modalities, as also found in study by Ferrari et al (FERRARI et al., 2018).

Chart 5 - Number of master's supervisions.



Source: Elaborated by the authors with data from Lattes Platform.

Chart 6 - Number of PhD supervisions.



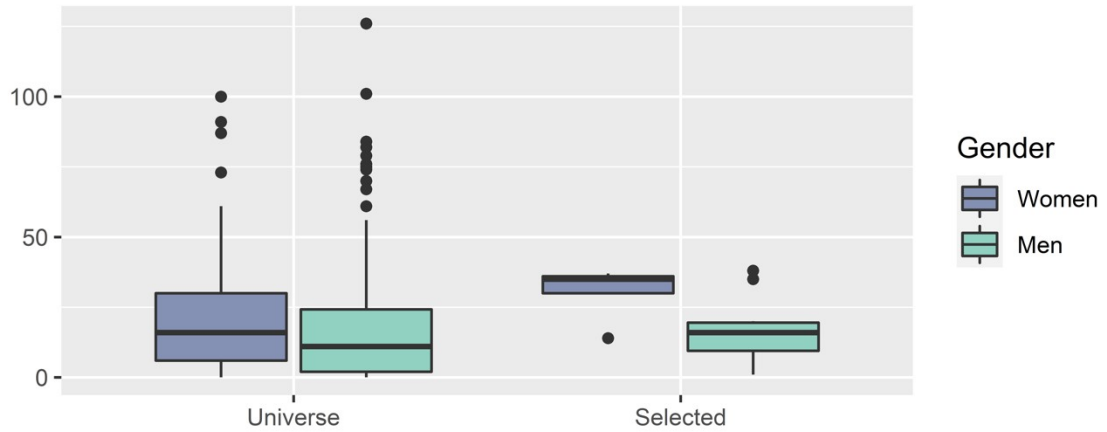
Source: Elaborated by the authors with data from Lattes Platform.

Chart 7 illustrates the number of undergraduate students supervised under the scientific initiation program. In the group of selected universities, a large difference is observed between men and women. Women have a higher number of supervised SI students, especially in the Selected group, once again consistent with the findings of Ferrari et al. in which women professors have almost twice as many SI students. This phenomenon is explained in the study by the fact that men do not invest time in SI supervision, since they are

only undergraduate students and, therefore, do not tend to develop competitive research and write papers that have the possibility of being published (FERRARI et al., 2018).

This behavior is also consistent with that portrayed by Bird (2010), in which women professors are destined to develop activities considered of lesser value within universities (BIRD, 2010). The overrepresentation of women in lower academic positions or in positions with temporary contracts in findings by van den Besselaar and Sandstrom (2017) shows that this leads to a vicious cycle that impacts negatively on women's scholarly productivity in the sense that this causes a scenario in which women have higher teaching loads and less access to funding, career perspectives and opportunities for research (VAN DEN BESSELAAR; SANDSTRÖM, 2017). Therefore, a larger number of women professors dedicating time to these types of activities and supervisions, as we could also see in our study, and can be the effect of gender bias and of a sustained existence of the glass ceiling in academic institutions.

Chart 7 – Number of SI Program supervisions



Source: Elaborated by the authors with data from Lattes Platform.

Considering so many important advances that could be noticed in the last decades in Brazil in relation to women's access to higher education and graduate studies and the substantial number of women present in the educational field, it was to be expected that they would be more present in positions such as that of Deans of Research and Graduate Studies. The fact that only 1/3 of the positions of dean of research and graduation are held by women, is, however, consistent with the literature that brings findings in the same sense: the difficulty women to occupy positions that accumulate greater power within universities, revealing a persistent glass ceiling. In addition, the small difference between all the results of the indicators (Charts 1 to 7) allows us to infer that for women to reach the top, it is necessary

that they adapt to the same metric intended for men. The problem lies precisely in the fact that the elements used in the creation, elaboration and maintenance of these metrics are biased towards the male world, with norms and precepts still very androcentric.

The Deans of Research and Graduate Studies are located at the level immediately below the dean or vice-dean, constituting the second level of university management. Our findings confirm our initial hypothesis, because they show that there has not yet been a breakthrough in solving the problem of gender equity in the most influential leadership and hierarchical positions in academic sector. Additionally, it is possible to identify that the processes of vertical exclusion are still very present and operative mechanisms. For this cycle of perpetuation of inequities to be broken, it is necessary to continue investigating, not only the origins, but also the dynamics involved in these processes. In this work, by showing that the differences in the profiles between men and women in positions of power within universities, were very similar, we identified that the central problem is not lack of equality, both are treated equally, but a lack of equity generated by a design of a more masculine career that does not take into account the reality of women.

A comparable situation occurs in the two main Brazilian funding agencies linked to science, research, and education, as well as in the Brazilian Academy of Sciences (ABC). Recent study showed an extremely low percentage of women members in the Academy, only 14%. Findings also revealed a disparity in the distribution of CNPQ funding. In the agency's universal calls, women scientists were targeted for smaller funds to carry out their research when compared to men scientists. Women are also more often represented among CNPq's Research Scholarship (PQ) holders at the lowest levels of the research classification system, in contrast, men scientists were more often found at higher levels of PQ holders (VALENTOVA et al., 2017).

The pipeline model portrayed in the literature explicitly favors men for demanding maximum performance in a short period, ignoring practices that result in a work climate that is often incompatible with the reality of women and reflects the real restrictions on women's career choices, especially after being awarded with their PhD's. The way this model is structured means that the non-participation of women in any of the career stages can be considered equivalent to giving up, making a subsequent return to the pipeline almost impossible or at least highly unlikely (AHMAD, 2017; SCHIEBINGER, 1999).

A study by Areas et al (AREAS et al., 2021) analyzed how the presence of women in leadership positions, evolved at the Brazilian Federal Agency for the Support and Evaluation

of Postgraduate Education (CAPES) and the National Council for Scientific and Technological Development (CNPq) over the last 20 years. Findings show that there is a vertical segregation once the percentage of women in both agencies decreases as the positions provide higher salary, prestige, and decision-making power. A horizontal segregation was also perceived, in the sense that, there is a lower participation of women in the positions of CNPq, an agency linked to the Ministry of Science, Technology and Innovations and associated with scientific research, than CAPES, which in turn is linked to the Ministry of Education and, in this case, more associated with an educational profile, traditionally more feminine.

To be able to occupy more prestigious positions, as is the case of Dean of Research and Graduate Studies, women need to fit into a profile of success that has its metrics based on the male world. This adaptation process is identified by Meyerson and Kolb as a strategy of "equipping women" (MEYERSON; KOLB, 2009). Women's qualifications are adapted to minimize the existing differences between men and women, so that they can compete as equals in the labor market, according to rules that, presumably, men already know (BENSCHOP; VERLOO, 2011; BRINK; VAN DEN BRINK; BENSCHOP, 2012; MEYERSON; KOLB, 2009).

In his theory of scientific field and capital Bourdieu addressed that the investment needed by researchers depends both on their amount, measured by the time devoted to research, among other factors, and by their nature, which includes especially the degree of risk involved. It also depends on the amounts of capital which they possess, as well as, on their positions in the field (BOURDIEU, 1975). As social constructions, gender norms do not dictate that women act in a certain feminine way or men the opposite. Political actors, however, traditionally composed of men, act as if sex and gender are associated with each other, leading to the establishment of a "gender logic of adequacy" within these institutional and scientific fields (CHAPPELL, 2006; CHAPPELL; WAYLEN, 2013).The problem resides in the fact that the homogeneity of the profile of those at the top, of those who make up the decision-making power in this academic environment, end up reproducing and perpetuating these metrics, rules, norms, and behaviors that exclude those who do not adapt. This homogeneity can also be understood as a lack of diversity, which in turn ends up limiting the stimulus to creativity and innovation.

4 Conclusions

In this paper, we quantified the diversity of in terms of gender of Brazilian Deans of Research and Graduate Studies in the year of 2019. We showed that only 36,9% of the positions were occupied by women, when considering all the HEIs, and an even lower percentage in the Selected group, 31,25% - percentages that are not consistent with the number of women in higher education. We also compared and categorized the profile of women and men deans using three indexes, production of knowledge, temporal evolution in the career and training of human resources.

At first, we explored the possibility that women, in order to reach power and leadership positions, would need to have a higher production than men. However, this was not the case. We showed that, except for a few small differences, men and women have a profile that differs very little. This means, then, that the requirements that women need to meet are the same, or at least very similar. This observation, however, does not allow us to affirm that there is gender equity, as the challenges faced by women differ fundamentally from those faced by men due to maternity issues, sexual division of labor, which still entails a heavier burden of household chores for women, harassment, amongst so many others. Women to reach the same rates as men, do so in a condition of clear inequality.

A noticeable conclusion concerns the small difference observed in the indicators referring the time elapsed in the career, when comparing men and women, which allows us to conclude that for women to reach the top, it is necessary that they adapt to the same metric intended for men. All this together allows us to conclude that, when it comes to leadership positions, Brazilian Higher Education is not diverse in terms of gender. The fact that only 1/3 of the positions of dean of research and graduation studies are held by women reveals additional challenges not faced by men indicating a persistent glass ceiling.

Finally, our results in this study show that equality without equity causes such effects that, in their career path, women need to deny their status, not as a way of creating a broader equity movement, but as a submission to an androcentrically designed model of success based on unformulated rules that do not take women’s reality into account. To reverse this situation, it is necessary to adapt the metric for promotion and progression in the career so as to allow different timings and different profiles which in turn would consequently include women that take longer paths due to the motherhood and other gendered issues that still permeate the academic environment.

Many of the problems women face in their career paths today, including those regarding leadership positions in higher education have deep historical roots and gender differences have been forged by these historical circumstances. The asymmetrical division of parenting and domestic tasks between men and women has a huge impact on women's careers once positions in leadership roles often involve working long hours and the reduced time dedicated to the paid workforce leads to fewer opportunities for advancement.

Bourdieu described this unequal and permanent struggle that takes place in the scientific field between agents, the dominant, who occupy the highest positions in the structure of the distribution of scientific capital, and the dominated, both equipped with proportional specific capital in pursuit of the appropriation the product of scientific labor accumulated by previous generations (BOURDIEU, 1975). In the academic and scientific setting, this can be translated into the still very present misogyny that prevents the reality of women from being considered in the creation, elaboration and maintenance of metrics that govern the academic career.

Higher education and research are powerful instruments of social change and universities can be strategical institutions for promoting gender equality, diversity, and inclusion, not limited to the context its own context, but also to society at large. Despite not being a new field of study, it can be said that, both in gender studies and in studies on higher education, there is still an enormous field of work and research to be developed on the underrepresentation of women and the lack of diversity in these environments. Bringing data and dealing with this issue can help to explain the dynamics and mechanisms of segregation, exploitation and inequality that reproduce a fraction of the social injustices faced by women that are still present today.

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