The Scientific Production of Women and their Presence in Management Position in Science and Technology Careers in the Ecuadorian Higher Education System

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ABSTRACT

Aim. This paper analyses the scientific production and the management positions in the universities of the Ecuadorian higher education system from a gender parity perspective, considering STEM careers as the central point of the analysis. Three perspectives were considered the underrepresentation of women in STEM careers, the underrepresentation of women in scientific production and in classic managerial positions, and the Norwegian paradox of equality.

Methods. This article used two databases: the first one was built from Ecuadorian scientific production, within the period 2010-2018, by the indexing platform SCOPUS. The second one, evaluates the presence of women in management positions and was built from the databases that universities and polytechnic schools report to the educational Ecuadorian authorities. Theoretical perspectives are discussed to explore the singularities of the Ecuadorian case, through an analytical and quantitative perspective.

Results. In the case of Ecuadorian scientific production men showed a greater presence in all fields, except for pedagogy and psychology. This results replicate for the case of higher education management positions (30% women, 60% men, on average).

Conclusions. The underrepresentation of women is generally confirmed, both in scientific production measured by publications, as well as in access to management positions, especially in science and technology. Also, in scientific publications, women are more likely to collaborate only with men, precisely because of the structures created around science, which not only have to do with the greater number of men involved, but probably with gender discrimination practices that are not visible in the mechanisms adopted for the analysis.

Keywords: gender equity, academia, scientific production, Ecuadorian higher education system, Norwegian paradox

Introduction

This article addresses two issues in Ecuadorian academia from the same perspective: gender equality. In general, historically, the academic field had been characterized by its elitism and by the majority presence of men. The gradual democratization at the beginning of the century led to a general change in the increase of the enrollment rate that favored excluded groups, both for economic, racial and gender reasons. However, in the case of Latin America, these changes lagged the central countries by more than twenty years (Papadópolus & Radakovich, 2006). However, although the presence of women in the university environment, both among students and professionals, has grown significantly to make it a basically female field, there are significant lags in terms of the participation of women in research and in managerial positions and the presence of women in high positions in academic collegiate bodies. The problem lies not only in access to higher education, but also in labor insertion (Seraquive & Ortiz, 2011) and significantly fewer women in senior university positions, such as rectorates (Escobar-Jiménez, 2022b).

Against this background, this article focuses on the study of the situation of gender disparity in scientific production and in middle management positions in the Ecuadorian higher education system. For this purpose, the approach adopted is that of the presence of women researchers published in science and technology, which is where the greatest disparity is observed worldwide. Likewise, this perspective is adopted

to see the relative presence of women in institutions with the greatest number of science and technology careers around the country, such as polytechnic schools and technical universities. This article discusses a central hypothesis in this type of studies, which is that the incorporation of women in the university world does not have its correlate in the academic world and that their presence in research entails a strong underrepresentation, especially in the fields of science and technology. In turn, this condition may accentuate conditions of inequality if we consider that this type of careers have a greater labor market and salary return. To carry out this objective, two databases are evaluated, which are explained in the methodological part, taking a statistical approach, both descriptive and inferential, analyzing them in the light of the theoretical discussion presented. This article considers a gender as underrepresented when a gender has a proportion of less than 40% (Sierstad, 2011). Of course, given the approach, the term "gender" is reduced to "sex", so the presence of men and women in both cases is compared.

Literature Review

The last three decades have seen a significant increase in the participation of women in higher education at all levels. Currently, the gross university enrollment rate around the world is higher for women than for men, an evolution that has been taking place over the last 50 years. In the world, the gender parity index was 0.74 women for every man in 1970 and went to 1.08 in the year 2009 (Ordorika, 2015). This reality also applies to Latin America, although it should be considered that the region had a relative lag in this regard, like that currently experienced in Asia and Africa, where men still have a higher enrollment rate. In the region, the lower rate of female enrollment has also been reflected in the participation of women in the economically active population (Papadópolus & Radakovich, 2006).

Regarding the presence of women in management positions and academic collegiate bodies, the situation differs from place to place, although the general trend is that men still have a majority presence, due to a variety of impediments, which are not only related to gender discrimination, but to conditioning factors related to the multiple activities that women develop in society, especially linked to the role of care and family (Díaz-Fernández et al., 2017).

In the Ecuadorian case, there has been an interesting evolution in the presence of women in management bodies. If one takes into account that access to the academic world is usually relatively late with respect to other jobs, due to the requirements necessary both for access to the university and to management positions (rectorships, deanships, directorships), in the most important positions the gender disparity in favor of men is very high (rectors), but an important generational turnover is noted in intermediate positions (directorships). There is a large incorporation of women in teaching,

which is inevitably reflected in the fact that in the younger generations, women have a greater presence (Escobar-Jiménez, 2022b).

In general, this relative improvement is not the same if we consider the fields of knowledge. When we refer to studies related to science, technology, and mathematics, which in the Anglo-Saxon sphere is known as STEM (Science, Technology, Engineering and Mathematics), female participation is substantially lower. During the school stage, women tend to have better grades than men in almost all areas, except, generally, in sports and mathematics. Even in cases where females score better in science and mathematics during the compulsory school stage, they then do not opt for these types of studies at university (Stoet & Geary, 2018). For example, studies in the United States during the 1980s and 1990s found that girls chose significantly fewer elective or non-compulsory courses with mathematics content (Fennema, 1990).

In a global study, based on the 2015 Programme for International Student Assessment (PISA) test scores, it is seen that there is no significant difference between the overall grade point averages of males and females in science. In this test which evaluates knowledge and skills in different areas. This test is applied to 15-year-olds with standardised scales that try to minimise cultural factors in the evaluation. However, if you look at certain types of strengths, women show a considerable advantage in reading and men in math. Similarly, when measuring boys' self-perceptions, it is noted that boys see themselves as more effective in science than girls perceive themselves to be (Stoet & Geary, 2018). In cross-sectional studies, self-efficacy or self-confidence (self-confidence) may help explain the phenomenon of gender differences in success in certain fields (Fennema, 1990, 1996).

If globally, the differences are mostly in mathematics, but not in science, where even women have better grades, why do women not pursue such careers in higher education? For Gijsbert Stoet and David C. Geary (2018) attention should be paid to girls' choices. Regardless of their school success, they have other preferences as a whole and go for other types of careers not associated with STEM. The factors are multiple and often more difficult to determine than is commonly believed. One traditional explanation is related to a "structural" view of how society imposes gender roles, in which women establish preferences according to social impositions. However, this explanation suffers from three central problems. The first is the difficulty of determining a clear relationship between such structures and their consequences since they are not fully distinguishable. The other problem is that there are counterexamples that could weaken this argument (as in the case of the Norwegian equality paradox). Finally, it is a causal simplification that does not consider the empirical data in this respect.

Probably the most important counterexample is the so-called "equality paradox" or often referred to as the "Norwegian equality paradox". Equality paradox is understood as the fact that in countries where gender disparity rates are lower (such as Scandinavian countries in general and Norway in particular), female enrollment ratios

in STEM majors is usually lower than in other countries with higher gender disparity (Corneliussen, 2021; Stoet & Geary, 2018; Thelwall & Mas-Bleda, 2020).

According to Stoet & Geary's (2018) study, rather than looking at the difference in PISA scores, attention should be paid to the strengths demonstrated by boys on the tests. When deciding on careers, even students who show strong strengths in math and science go for other options and this is more marked in countries with greater equality. It is shown that the probability of pursuing science, technology, engineering, mathematics (STEM)-related careers is inversely proportional to the gender parity index in the most equal countries; that is, in countries with high gender inequality it is more likely to find women studying engineering and science (Sierstad, 2011; Thelwall & Mas-Bleda, 2020).

One of the possible explanations is that, in poorer and less democratic countries, women see better life opportunities in careers with more job opportunities; that is, they are somehow forced by circumstances. Precisely, the Norwegian paradox assumes that all things being equal, the odds are lower, because study preferences for women are different from those in STEM, focusing on other types of careers, many of them care related. For example, the ratio of engineers in Norway tends to be 1 woman to 9 men, the reverse is true in care areas.

Criticisms of the Norwegian equality paradox can be summarized as follows: a) several elements of systematic inequality in managerial positions are not considered, implying that there is a ceiling to women's growth and development that is not evident at all levels and is often fostered precisely by equality policies (Inga et al., 2020); b) the focus of analysis is spurious and misguided, as the ideas of "free choice" in careers and the individualistic view of such choices obscures the structural causes underlying personal choices and obscures the structural causes of personal choices; c) the focus of analysis is spurious and erroneous, since the ideas of "free choice" of career and the individualistic view of such choices obscures the structural causes that underlie personal choices and that determine gender roles, among other causes (Corneliussen, 2021).

This does not imply that there are no complex scientific or technical careers that do not have a higher proportion of women. The case of medicine is more marked in this aspect, where women students and professionals are already a majority around the world (O'Neill et al., 2011), as in the Ecuadorian case (Torres-Rentería & Escobar-Jiménez, 2022). Other types of scientific careers such as biology also have a significant relative composition of women, both at the European level (Esteve, 2017), as well as in the Ecuadorian case itself, where the composition of women with doctoral degrees is significantly more important than in other scientific fields (Escobar-Jiménez, 2022a).

However, the problem is not only in the presence of students, but also in job opportunities, salary returns and the possibility of accessing the academic world. Despite this presence, there is generally a relative lag in the following aspects:

- The presence of women in academic collegiate bodies is relatively marginal in certain cases and underrepresented in others. Latin America shows a significant relative improvement, in some cases with pronounced growth curves in participation, but still with important general gaps (del Pino Arriagada et al., 2018; Escobar-Jiménez, 2022b).
- If one considers that doctoral education develops research qualities and skills, considering the time and effort involved in the doctoral degree, women have more restrictive access in this regard. It has been shown that men tend to complete doctoral studies faster, which becomes more marked in certain fields of knowledge (Seagram et al., 1998). In Ecuador, there is a significantly smaller difference in the number of female PhDs and in the number of male PhDs (Escobar-Jiménez, 2022a). The most plausible explanation is the multiple roles of women in society, especially in family care, which delays or simply prevents them from obtaining a degree. Women are forced into this role or opt for it voluntarily and this leads to a lower presence in academic positions with doctoral requirements, as well as in research (Yedidia & Bickel, 2001).
- In terms of research measured by publications, it is often found that women have a greater presence in fields such as medicine and social sciences and not in science and technology (Thelwall & Mas-Bleda, 2020). It is often noted that research networks do not consider gender aspects, but there is a lower proportion of publications by women around the world (Pezzoni et al., 2016).
- Again, countries with lower gender equality have higher probabilities of scientific output in science and technology (Stoet & Geary, 2018; Thelwall & Mas-Bleda, 2020).

Methodology

This work is part of the analysis and construction of two databases. For the analysis of scientific production in Ecuador, the database of publications indexed in the Scopus platform was used. In this sense, scientific production is measured by the publications registered by the country's institutions in this platform. This database is used because it is the most extensive in the world in terms of indexing publications. The scientific production data in this platform were analyzed between 2010 and 2018. Subsequent registration is not used, because the same platform updates its final data with a space of 2 years. The number of total publications registered by Ecuadorian institutions (basically universities and research institutes), between those years, amounts to 15,999. For the analysis of the production, a representative sample was taken, with a margin of error of 5% and a confidence interval of 95%. The sample size was n=357 and was distributed by year according to the relative weight of each year in the total number of articles published.

The data obtained were analyzed on this basis. Following the method of Mike Thelwall and Amalia Mas-Bleda (2020), the proportion of authors versus authors of the articles was considered. To differentiate in the case of male and female authors

in the same paper (as is the majority case in a collective enterprise such as scientific research), the first authors are considered as an indicator of the prevalence of one gender over the other in the product, despite the fact that the first author may be the person who has made the greatest contribution to the article, assuming that the first author is usually the leader of the research or of the institution producing the article, which for the Ecuadorian case may also implicate an underrepresentation of the contribution of women or an underrepresentation of women in scientific positions Articles whose authors are listed alphabetically were not considered, as is often the case. Based on this information, the topic of each of the articles was analyzed according to the fields of knowledge established by the United Nations Educational, Scientific and Cultural Organization (UNESCO) to be able to divide into those concentrated more in STEM.

Table 1

Distribution of the sample of articles indexed in Scopus

Year	Number of articles	% of total	Sample
2018	4606	28.79	103
2017	3633	22.71	81
2016	2530	15.81	56
2015	1716	10.73	38
2014	1071	6.69	24
2013	783	4.89	18
2012	670	4.19	15
2011	510	3.19	11
2010	480	3	11
Total	15999	100	357

Source. Own research.

For the analysis of women's management positions in universities and polytechnic schools, a database of the Higher Education Council was used, whose information is obtained from the consolidation of reports from the country's own higher education institutions. This database contains 4,308 entries of information, in which the position, university of work, degree, age, time of work at the university, years of access to the position are known. For the analysis, a distinction is made between types of universities according to the educational offer. A distinction is made between Polytechnic Colleges, Technical Universities, Universities, and Universities specialized in pedagogy, arts and Social Sciences.

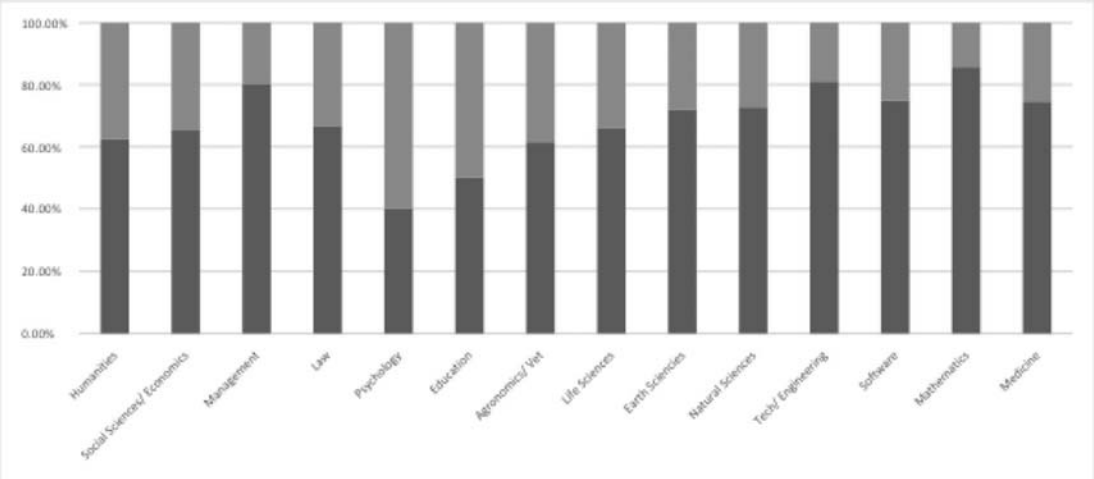
Analysis of the Information

Scientific Production by Gender

As mentioned above, the methodology adopted is the analysis of scientific production measured by publications indexed in the Scopus database, grouping each article by field of knowledge according to the UNESCO cataloguing. First, it is interesting to note the significant growth in the production of articles from Ecuadorian institutions. It is observed that the participation of women does not have a pronounced curve different from the growth of articles, so their presence is constant over time. However, in absolute terms, the lag is significant in comparison with men. Of the total sample, men present, on average for all fields, 70% of first-authored articles, compared to the remaining 30% of women. As can be seen in the graphs below, if we compare the participation of women by field of knowledge, women have a greater presence in pedagogy and psychology, but not in the rest.

Figure 1

Participation of women in publications by fields of knowledge



Source. Own research.

Except for the two mentioned above, men have a greater presence in all other fields, but the difference is more pronounced in the science and technology fields. The sharpest difference is in the participation of women in engineering and technology with 18.92% and in mathematics, 14.29%, as suggested by the literature. This means that, according to the odds ratio, the probability of finding an article written by men in STEM and medical fields is 1.6821 times higher than the probability of a woman being the first author. Likewise, applying a difference of proportions test shows that there are significant differences between the proportions of men and women in STEM participation. Thus, the expected prediction of a higher participation of women in relative terms in the

areas of social sciences, psychology and pedagogy is fulfilled. However, a substantial difference is observed in the humanities.

In the case of low- and middle-income countries, as explained above, the literature suggests that there is a higher probability of women's participation in science and technology than in countries with higher incomes and greater gender equality. Except for the oil-rich countries of the Middle East, with very high incomes and quality of life, but with wide gender disparity, greater equity is correlated with higher incomes. Being a middle-income country, it would be expected that, in Ecuador, the participation of women in science and technology would be higher than in high-income countries, but this is not evident in the case of scientific production measured in publications. Ecuador has ranges like those shown by countries with broad equality, especially in fields such as engineering and mathematics. Of course, there are cultural factors that are not considered in this aspect.

Co-authorships present the following general data:

Table 2

Article co-authorships

	# Men coauthors	**# Women coauthors**
Total	651	267
Mean	1.82	0.74
STEM	565	217
Mean	2.03	0.78

Source. Own research.

In general, the proportion of female co-authors is higher than that of female first authors. Likewise, in general, the articles have more male collaboration on average, the same that goes up for the case of STEM. Considering the above data, this implies that women tend to have a greater collaboration in science and technology articles. It is also found that the average number of male authors is significantly higher when it comes to science and technology. Now, the following table shows the collaborations between men and women in different cases and yields very interesting data on the tendency of collaboration by gender, if we relate the first authorships.

Table 3

Collaboration between genders

	Total	**Co-authorship only opposite gender**	**Ratio**	**OR**
Men authors	253	56	22.13%	
Women authors	104	53	50.96%	2.30236951
Men in STEM	203	34	16.75%	
Women in STEM	74	38	51.35%	3.06597774

	Total	Co-authorship same genre only	Ratio	OR
Men authors	253	134	52.96%	1.96725014
Women authors	104	28	26.92%	
Men in STEM	203	103	50.74%	2.68191415
Women in STEM	74	14	18.92%	

Source. Own research.

According to the table above, if we consider the collaboration of first authors with researchers of the opposite gender, we can see that the probability that a woman collaborates only with men is 2.3 times higher than the opposite, that men collaborate only with women. This ratio rises considerably when it comes to science and technology. In other words, women collaborate three times more with men only when they are first authors. This could be due to two basic causes. The first is that the probability of finding male researchers in this field is higher, and the second is that the collaboration networks are therefore dominated by men. These structures make collaboration only with men inevitable for women. On the other hand, when we consider male-only collaboration, the odds are almost twice as high for male-only papers, and this grows to 2.68 for STEM. In general, these types of networks continue to perpetuate underrepresentation.

If we follow Robert Merton's (1968) proposal on science, the recognition system generates overcompensations for those who have privileged positions both in publications and in the receipt of resources for research. This means that a person with previous "credentials" is more likely to publish and receive resources regardless of the quality of the proposals. In this sense, not only the number of male researchers in STEM, but the "credentials" determine that women are more than three times more likely to collaborate only with men than the opposite possibility (men collaborating only with women).

Authorities in Science and Technology Institutions

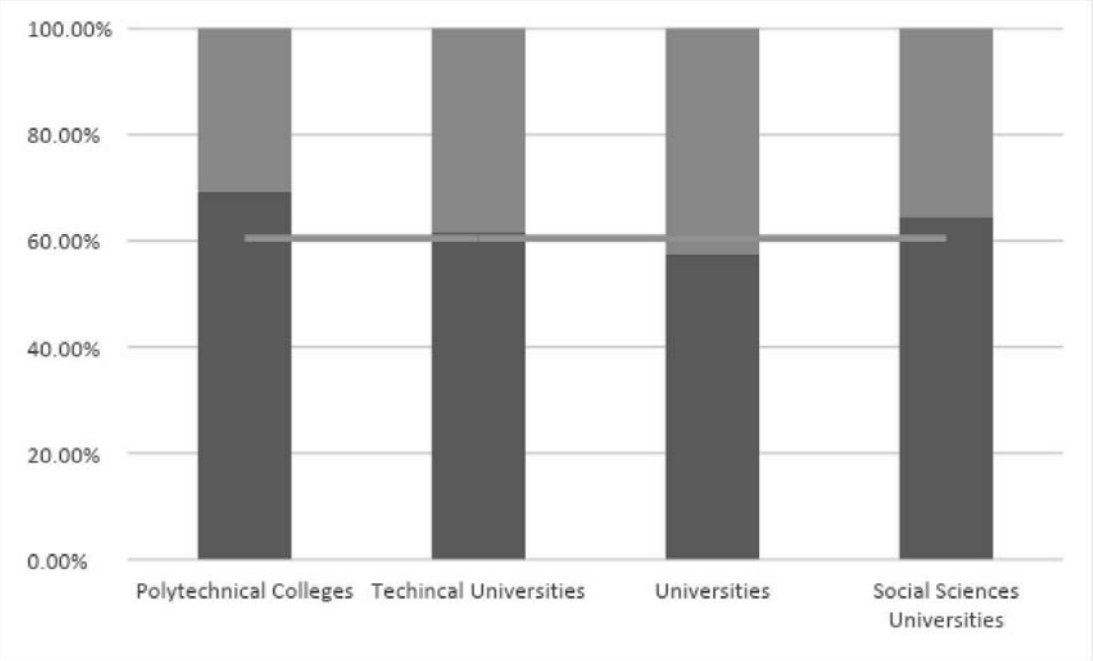
This section uses the information provided by the universities to the Higher Education Council. According to the type of educational offer, a division was made among the types of universities, recognizing four types: a) polytechnic schools, b) technical universities, c) universities, d) universities specialized in social sciences and humanities. The data are shown in the table below. As can be seen, the overall average participation of men in middle management positions in higher education is 60.54%. If we consider that we use a range of 40% female participation as a yardstick for underrepresentation, we see that we are in the borderline range of inequity. But the issue changes when we divide the universities by their type of educational offerings. In the case of polytechnic schools, those whose science and technology component is the largest in their educational offerings, the proportion rises to 69.34%. If we apply

a test of difference of proportions at a 95% confidence level, we see that there is a statistically significant difference. This situation confirms the expected hypothesis about the underrepresentation of women in this type of careers. This proportion improves in the case of universities offering diversified careers in the humanities, social sciences, administration, and pedagogy.

Graphic 2

Participation of women in managerial positions in universities

Note. We start from the fact that polytechnic colleges and technical universities have a higher number of STEM careers.

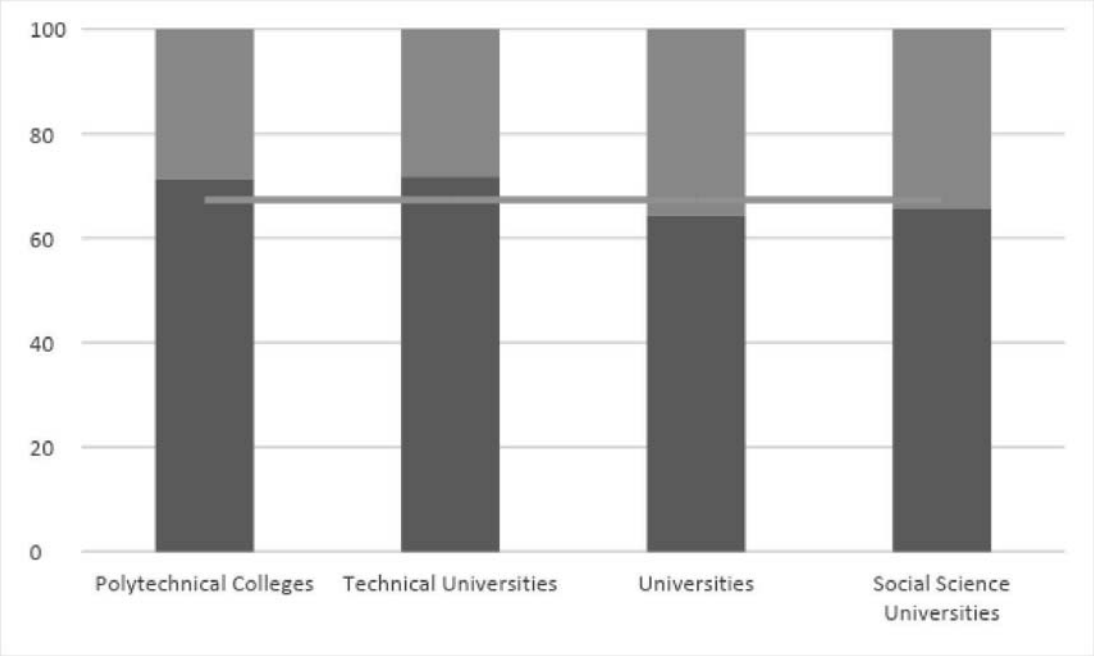


Source. Own research.

Interestingly, for the case of universities specializing in humanities, pedagogy and social sciences, there is also a significant difference in proportions in statistical terms. If we look at doctoral degrees by type of university, according to their content of science and technology degrees, we can also observe that the higher the content of STEM academic offerings, the greater the disproportion of PhDs versus PhDs. The overall average number of PhD holders in the higher education system is 67.34%, but there is a statistically significant difference in the probability at 95% confidence that there are more male PhDs than average in polytechnics and technical universities. Similarly, there is a significant probability difference in favor of women, with respect to the overall average number of PhD graduates, in universities and universities specializing in social sciences, pedagogy and the arts. This confirms the tendency of underrepresentation of graduates according to certain areas of knowledge, as has been the trend in the data presented in this paper.

Graphic 3

Participation of women and men with doctoral degrees in managerial positions in universities in Ecuador.



Source. Own research.

Finally, in this data analysis, it is interesting to note that women access management positions at a younger age and for less time, as can be seen in the table below. In all cases, women need much less time than men for this and at a younger age, which shows important generational changes in access to positions in higher education. Likewise, in the case of polytechnic schools, the number of years required to access a position is significantly higher.

Table 4

Age at which access to management positions and time required in years for access to management positions according to the universities' offerings

	Polytechnical Colleges	**Technical Universities**	**Universities**	**Social Science Universities**
Men	50.37	48.9	51.06	51.2
Women	46.15	46.27	48.1	47.49
General	49.08	47.89	49.81	49.88
	PC	TU	Univ	SC Univ.
Men	18.66	12.54	13.46	7.61
Women	14.56	10.75	11.76	4.63
General	17.4	11.85	12.74	6.55

Source. Own research.

Discussion and Conclusions

According to the terms proposed for the analysis, the underrepresentation of women is generally confirmed, both in scientific production measured by publications, as well as in access to management positions. It is also confirmed that such underrepresentation is more acute in science and technology. The literature and empirical data predict that in countries with lower incomes and greater gender inequality, women are more likely to pursue careers in science and technology, which have higher employment and salary returns. However, the available data suggest that enrollment levels are like those in high-income countries. It should be clarified that this does not consider cultural factors that determine career selection between genders and the possibility of a change being reflected in scientific output.

Other caveats and observations on the data and results presented should also be clarified at this point. First, it is recognized that the methodology of taking publications indexed in international platforms as a proxy for scientific production is a reduction that should be considered. There is a set of scientific practices that are left out, some even more important (such as patents). However, this method does account for the communication and internationalization of research in a country, which is very useful for studying participation by gender. Of course, there is also a strong assumption that first authorships are more relevant in research. In general, it is probably more accurate to think of first authorship as visibility in the research role. Again, taking up the view of the American sociologist Merton, the reward systems of science create overcompensations that are well demonstrated in the order of authorship in the articles.

It is also interesting to note that women are more likely to collaborate only with men, precisely because of the structures created around science, which not only have to do with the greater number of men involved, but probably with gender discrimination practices that are not visible in the mechanisms adopted for the analysis. However, this does not imply that we can attribute the problems to structural concepts that are not easy to study and understand concretely. It should also be recognized that the difficulty of general study does not eliminate their possible existence. Despite this, this paper does not opt for the structural perspective of gender discrimination and limits itself to the perspective explained in the introduction and methodology.

Regarding female participation in management positions, the generational turnover that can be observed in terms of age and the time it takes women to reach these positions is decisive and, if it continues in this way, would eliminate under-representation in this aspect. However, we must bear in mind that we are talking about intermediate positions, which probably do not always have salary compensation. It is also important to understand that in the general context of Ecuadorian higher education, access to this type of positions allows improving future positions (opting for higher academic positions) due to the requirements of academic administrative management. However, many times entry to these positions may imply more work without future compensation.

Another limitation of this approach is to understand that greater participation of women in management positions does not necessarily lead to better gender policies.

A central issue is to look at degree times and that the significantly lower number of women with PhDs is an important point to consider in academic requirements. In general, women need more time to graduate, and the attainment of certain requirements is more complicated. Doctoral studies have a high opportunity price because they imply a sacrifice of entry into the labor field, as well as a delay in achieving probable personal goals, such as starting a family or a career in another field. Pregnancy, breastfeeding, and maternity periods tend to delay the time required, either to opt for a doctorate or to complete it.

In view of the above, it is important that gender disparities in doctoral studies be considered when imposing requirements for access to positions. Likewise, in the search to create gender parity mechanisms in scientific fields, compensation mechanisms should be sought when opting for these careers. The problem is that these academic fields greatly improve labor and salary options in today's world. In general, the quota policy in these fields has not yielded great results (Corneliussen, 2021), but compensation mechanisms and affirmative actions have. Why is it desirable for women to have more participation in science and technology? Precisely because in today's world these are ways to achieve equality in other areas, such as the economic and symbolic. Greater participation of women in knowledge fields also improves their overall return of social benefits. Knowledge societies also tend to be more egalitarian in income distribution and in the achievement of different life goals.

REFERENCES

Corneliussen, H. G. (2021). Unpacking the Nordic Gender Equality Paradox in ICT Research and Innovation. *Feminist Encounters: A Journal of Critical Studies in Culture and Politics*, *5*(2), Article 25. https://doi.org/10.20897/femenc/11162

del Pino Arriagada, S., Vallejos Cartes, R., Améstica-Rivas, L., & Cornejo-Saavedra, E. (2018). Presencia de las mujeres en la alta gestión universitaria. Las universidades públicas en Chile [Presence of Women in University Management. Public Universities in Chile]. *Páginas de Educación*, *11*(2), 176-198. https://doi.org/10.22235/pe.v11i2.1633

Díaz-Fernández, M. del C., Matínez-Torres, M. del R., & López-Bonilla, J. M. (2017). Mujeres en órganos de gobierno universitarios. Nuevo contexto normativo y políticas de igualdad [Women at University top management levels. New legal context and equity plans]. *Convergencia Revista de Ciencias Sociales*, *75*, 107-131. https://doi.org/10.29101/crcs.v0i75.4012

Escobar-Jiménez, C. (2022a). Doctores, incentivos de titulación e impacto en la investigación: Un panorama general de los profesores con doctorado en el sistema de educación superior ecuatoriano [Doctors, degree incentives and impact on research: An overview of professors with doctorates in the Ecuadorian higher education system]. *Revista Andina de Educación*, *5*(2), Article 000528. https://doi.org/10.32719/26312816.2022.5.2.8

Escobar-Jiménez, C. (2022b). Paridad de género entre las autoridades del sistema de educación superior ecuatoriano [Paridad de género entre las autoridades del sistema de educación superior ecuatoriano]. *Íconos - Revista de Ciencias Sociales*, *26*(74), 139–158. https://doi.org/10.17141/iconos.74.2022.5246

Esteve, A. R. (2017). ¿Qué estudios universitarios de ciencia y tecnología prefieren las mujeres? *Enseñanza de las Ciencias: Revista de Investigación y Experiencias Didácticas*, *Extra*, 5585-5591.

Fennema, E. (1990). Teachers' Beliefs and Gender Differences in Mathematics. In E. Fennema & G. C. Leder (Eds.), *Mathematics and Gender*. Teachers College Press.

Fennema, E. (1996). Mathematics, Gender, and Research. In G. Hanna (Ed.), *Towards Gender Equity in Mathematics Education* (pp. 9-26). Kluwer.

Inga, M., Berit, S., & Jelena, S. (2020). Understanding the Nordic Gender Diversity Paradox. *TalTech Journal of European Studies*, *10*(1), 40-57.

Merton, R. (1968). The Matthew Effect in Science: The Reward and Communication Systems of Science are Considered. *Science*, *159* (3810), 56-63.

O'Neill, L. D., Wallstedt, B., Eika, B., & Hartvigsen, J. (2011). Factors associated with dropout in medical education: A literature review. *Medical Education*, *45*(5), 440-454. https://doi.org/10.1111/j.1365-2923.2010.03898.x

Ordorika, I. (2015). Equidad de género en la educación superior. *Revista de la Educación Superior*, *44*(174), 7-17.

Papadópolus, J., & Radakovich, R. (2006). Educación Superior y Género en América Latina y el Caribe. In UNESCO International Institute for Higher Education in Latin America and the Caribbean (Ed.), *Informe sobre la educación superior en América Latina y el Caribe 2000-2005* (pp. 117-128). IESALC.

Pezzoni, M., Mairesse, J., Stephan, P., & Lane, J. (2016). Gender and the publication output of graduate students: A Case study. *PLOS ONE*, *11*(1), Article e0145146. https://doi.org/10.1371/journal.pone.0145146

Seagram, B. C., Gould, J., & Pyke, S. W. (1998). An investigation of gender and other variables on time to completion of doctoral degrees. *Research in Higher Education*, *39*(3), 319-335. https://doi.org/10.1023/A:1018781118312

Seraquive, J. E. G., & Ortiz, C. V. J. (2021). Equidad de género en la educación superior en Ecuador: Aproximación a su conceptualización [Gender equity in higher education in Ecuador: approach to its conceptualization]. *Revista Scientific*, *6*(20), Article 20. https://doi.org/10.29394/Scientific.issn.2542-2987.2021.6.20.18.327-339

Sierstad, C. (2011). *Exploring the Norwegian paradox of vertical sex segregation: Strategies and experiencies in politics, academy and company boards*. University of London.

Stoet, G., & Geary, D. (2018). The gender-equality paradox in science, technology, engineering, and mathematics education. *Psychological Sience*, *29*(4), 581-593. https://doi.org/10.1177/0956797617741719

Thelwall, M., & Mas-Bleda, A. (2020). A gender equality paradox in academic publishing: Countries with a higher proportion of female first-authored journal articles have larger first-author gender disparities between fields. *Quantitative Science Studies*, *1*(3), 1260-1282. https://doi.org/10.1162/qss_a_00050

Torres-Rentería, S. R., & Escobar-Jiménez, C. (2022). Determinantes de la deserción y permanencia en la carrera de Medicina: Evidencia del Sistema de Educación Superior ecuatoriano [Determinants of desertion and permanence in the medical career: Evidence from the Ecuadorian Higher Education System]. *Revista Andina de Educación*, *5*(1), Article 1. https://doi.org/10.32719/26312816.2022.5.1.6

Yedidia, M., & Bickel, J. (2001). Why aren't there more women leaders in academic medicine? The views of clinical department chairs. *Academic Medicine: Journal of the Association of American Medical Colleges*, *76*(5), 453-465. https://doi.org/10.1097/00001888-200105000-00017