

Women's Experiences in Latin American Engineering Contexts: A Systematic Literature Review

Martha Lucia Cano Morales
Rowan University
Glassboro, NJ, USA
Pontificia Universidad Javeriana
Bogotá, Colombia
canoma14@rowan.edu

Justin C. Major
Rowan University
Glassboro, NJ, USA
majorj@rowan.edu

Abstract— This research full paper investigates women's experiences within the Latin American engineering context using a systematic literature review process. Situated within a broader research project about women's intention of attrition from the engineering workforce in Colombia, this review aimed to contextualize the project within existing scholarship. While research on women's attrition from engineering roles is common in the United States, a similar exploration is lacking in Latin American countries. However, we anticipated the existence of literature detailing women's experiences in engineering workplaces across Latin America, which we sought to compile and analyze to establish background information for the project. Given the limited literature specific to Colombia alone, our focus extended to encompass other Latin American countries sharing cultural similarities. Following the application of exclusion criteria, we reviewed $n=12$ peer-reviewed papers. This review revealed a scarcity of research on women's experiences in engineering environments in Latin America, focusing on only four countries within the region: Brazil, Chile, Mexico and Colombia. Findings in the literature showed that women encounter barriers to entering the engineering job market, and often experience discrimination, harassment and undervaluation once they are in the field. Particularly concerning is the overt and derogatory nature of discrimination in certain sectors. Despite these challenges, women persevere in their careers, driven by the desire to pave the way for other women and contribute to their countries' advancement. There remains a need to enhance the quality of research studies on women's experiences and representation in the Latin American engineering sector. Conducting more research on gender inequalities in the Latin American engineering workplace is essential to identify strategies for achieving gender parity within the field.

Keywords— *Women in engineering; Latin America; Work environments; Gender inequality.*

I. INTRODUCTION

The underrepresentation of women in the engineering field has remained unchanged over the past two decades [1,2]. As of 2022, only 16% of engineering positions were occupied by women, significantly lower than women's overall presence in the job market, which stands at 46.8% [2]. A significant contributing factor to women's underrepresentation in the field is that women leave the profession at high rates both during college, and after obtaining their degrees [3].

Research aimed at understanding the attrition of women engineers from the engineering workforce has been primarily conducted in the United States [4], [5–14]. These studies highlight the role of engineering work environments and engineering culture in women's decision to leave the field. Findings from these studies provide valuable insights to organizations and stakeholders in reducing the attrition of women in the US. For instance, understanding the role of organizational support in helping women to expect better outcomes from staying in engineering [13]. However, the same cannot be said for countries where minimal research has been conducted on the experiences of women engineers, such as countries in Latin America.

Research on the challenges and underrepresentation of women in engineering in Latin America has primarily been carried out in academic settings [15–23], with a lack of research in professional context. Differences between Latin American and Anglo societies, particularly in terms of gender equality [24,25], suggest that women engineers in Latin America may have different experiences in the workplace compared to those reported in research from the US. Given the scarcity of research on women engineers in Latin America and anticipating differences with the finding in the US, we aimed to broaden the scope of research on the challenges faced by women engineers to include workplaces contexts in Latin America. To begin this research effort, we aimed to establish an accurate panorama of the research that has been previously conducted in Latin America.

This paper presents the procedures and results of a systematic literature review. We sought to map and assess existing literature on the experiences of women engineers in workplace environments in Latin America. By doing so, we expect this work to serve as a foundational base for our future research which will explore women's attrition from the engineering workforce in Colombia.

II. METHODS

The systematic review presented in this paper adheres to the methodology and recommendations proposed by Borrego, Foster and Froyd [26] for conducting systematic literature reviews in engineering education. Our work comprised five main steps: 1) our decision to conduct a systematic review, 2) our identification of the scope and research questions, 3) our

definitions of inclusion criteria, 4) our search and organization of sources, and 5) and our critique and appraisal. The development of each step is described further.

A. Decision to Conduct a Systematic Review

This research is part of a larger project investigating the intention of women engineers to leave the engineering workforce in Colombia. Initially, we conducted a literature search to contextualize the project within the existing literature in the Colombian context. However, we found limited background information on women engineers' experiences in Colombia working environments. We extended our search to other countries in Latin America, which share cultural similarities with Colombia, but also faced difficulties in finding relevant literature. Given the limitations in our findings, we concluded that a systemic literature review was necessary [26] to obtain an accurate picture of previous research within the Latin American context.

B. Scope and Research Questions

Considering the limited results of our previous literature search, we opted for a broader scope. Therefore, rather than focus on Colombia only, we outlined our scope to research studies within the Latin American context. Specifically, we sought literature that explored women engineers' experiences within engineering work settings. The research questions guiding our systematic literature review were as follow:

1. What insights does existing literature offer regarding women engineers' experiences within engineering work environments in Latin America?
2. What understanding can be gained concerning women's intention to leave the engineering field within the Latin American context?

C. Inclusion Criteria

Guided by the scope and research questions presented in the previous subsection, we defined the inclusion and exclusion criteria presented in Table I. These criteria guided the design of our search queries and our selection of papers.

D. Search and Organization of Sources

The search was conducted on November 2023, across six different databases, including Academic Search Complete, EBSCO, Engineering Village, ERIC, Scopus and Web of Science.

TABLE I. INCLUSION AND EXCLUSION CRITERIA

<i>Inclusion Criteria</i>
<ul style="list-style-type: none"> • Peer reviewed papers written in English or Spanish. • Research conducted within the context of engineering work environments in Latin America. • The population included women engineers. • The findings or discussion addressed women experiences.
<i>Exclusion Criteria</i>
<ul style="list-style-type: none"> • Not peer reviewed. • Not in English nor Spanish. • Research does not include engineering work environments in Latin America. • Population did not include women engineers. • Findings or discussion did not address women experiences.

The general search string used was: (woman OR women) AND (engineer OR engineering OR engineers) AND (work OR career OR industry OR government OR job OR occupation OR profession) AND NOT(student* OR undergraduate OR university OR college OR academi* OR "high school"). The NOT arguments were included after an initial round of search in which most identified papers were in academic settings.

The search was limited to titles, keywords and abstracts. The term "Latin America" was not included in the search string to encompass studies conducted in individual countries.

To limit the search to Latin America countries, we used the country filter provided by the databases' search interface and selected only countries within the region. This approach poses a limitation, because it excluded potential studies in Latin America that did not have authors affiliated with Latin American institutions. Other filters used within the search included peer-reviewed and conference publications, and papers written in English or Spanish. The search was not limited to a specific time range. For Scopus, we filtered the subject area to exclude results from health and biological sciences, as they were not relevant to our study, and they drastically increased the number of papers identified in this database.

After completing the search in all databases, duplicates were removed, and papers were screened by title, abstract, and full text, applying exclusion criteria at each stage.

E. Critique and Appraisal

After identifying the set of papers to be included in the review, the next step was to systematically assess the quality of the study presented on each of them [26]. This process of critique and appraisal included three steps.

1) *Mapping*: In this step we organized and reported characteristics of papers, including type of publication, country, language, year, participants, and study's purposes.

2) *Critique*: In this step we assessed and reported the quality of the studies presented in the papers. For this assessment we used the questions presented in Table II.

3) *Synthesis*: In this step a thematic analysis was conducted to identify and report recurrent themes accros studies' results and discussion. With this synthesis we stablished the bottom-line to answer our research questions and find the gaps remaining in our undertsning of women's experiences in engineering context in Latin America.

TABLE II. QUESTIONS FOR QUALITY ASSESSMENT

<i>Questions</i>
<ul style="list-style-type: none"> • Does the study include a theoretical framework guiding the procedures? • Is specific description of data collection and data analysis reported within the paper? • Is there an internal consistency between the study's purpose, research questions, theoretical framework, procedures, and interpretation of the results? • To which extent discussions and conclusions are supported by evidence?

III. RESULTS

A. Paper Identification and Selection

The number of papers identified and filtered through each stage of screening are presented in Table III. Of 199 initial papers identified, 135 remained after eliminating duplicates. The titles of these 135 papers were screened to identify if they met the exclusion criteria, 62 titles met the exclusion criteria, leaving 73 papers for abstract screening. Of those 73 papers, 17 were excluded after screening their abstract against exclusion criteria, and 56 passed to the next phase of full paper screen.

During the full paper screen, both exclusion and inclusion criteria were evaluated to reach a final decision. One study did not meet the inclusion criteria of having women engineers within the study's population, instead, it only included male engineers. However, the purpose of the study was to investigate men's perception of gender inequality in the workplace, so we decided to include it in the review considering its relevance. The reasons for exclusion during the screening phases included papers that were not related to engineering or women's experiences, focused solely on students rather than work environments, included women from countries outside of Latin America without specific country breakdowns, were not original research studies but literature reviews or editorials, were written in Portuguese, and three papers were inaccessible through the library services of the authors' institutions. A total of $n=12$ papers were left for final review.

B. Mapping

Table IV presents a summary of the general characteristics of the 12 papers included in this review, detailing their titles, authors, publication years, publication types and sources, languages, and countries of origin.

The final selection included 6 conference papers and 6 journal articles. Most papers originated from Brazil ($n = 7$) and Mexico ($n = 3$; with one coming from Chile, and one from a collaboration between Mexico and Colombia). Most papers were published in the last 7 years ($n= 11$), with one published prior to that time window in 2001. Notably, the year 2021 had the highest number of papers ($n= 4$), followed by 2022 ($n= 3$). Language-wise, the majority were written in English ($n =10$), with two in Spanish.

Out of the 12 papers reviewed, four included engineers from various disciplines and working fields, while four focused solely on engineers in the software and information technology (IT) field. Additionally, two papers included engineers exclusively

from the construction field, one solely from the chemical engineering field, and one involved a woman working in academia.

Most of the studies exclusively included women in their sample populations ($n=8$), while three included both women and men, and one, solely men. Despite the latter study not meeting the inclusion criteria of having women in the sample population, its relevance to understanding gender dynamics in the engineering workplace led to its inclusion. Regarding population sizes, one study involved a large population sample ($n = 331,376$), utilizing extensive datasets from the Brazilian census. Three studies had medium population sizes ($81 \leq n \leq 181$), while the remaining eight had small population samples ($n \leq 31$).

C. Purposes

We categorized the purposes of the papers into three overarching themes to discern the common motivations behind these studies:

1) *Women's experiences in engineering working environments*: Seven papers aimed to explore women's experiences, as well as to identify challenges and barriers faced by female analog astronauts [27], women in construction sites [28,29], chemical engineering [30], industry [31], and women in leadership roles [32,33].

2) *Women's representation and roles in engineering*: Three papers focused on measuring women's representation in engineering working environments, including percentage representation, as well as the roles women have in these environments.

3) *Gender inequality in engineering*: Four papers intended to explore gender inequality within the engineering field [34–36], alongside strategies to address them [35,37].

D. Critique

To assess the quality of the research presented in the papers we thoroughly addressed the questions outlined in Table II for each of them.

1) *Theoretical framework*: Not including a theoretical framework to guide the studies was the biggest weakness of the papers we analyzed. Employing a theory in research is important as it provides a lens through which research questions are shaped and findings are analyzed [38]. Out of the twelve papers, only one specifically described the theory used within

TABLE III. NUMBER OF PAPERS IDENTIFIED AND INCLUDED AT EACH STAGE

<i>Database</i>	<i>Papers identified</i>	<i>After removing duplicates</i>	<i>Filtered by title screening</i>	<i>Filtered by abstract screening</i>	<i>Included after full paper screening</i>
Scopus	92	90	47	41	10
Engineering village	68	26	13	6	1
Web of Science	24	11	6	5	0
EBSCO	9	5	4	2	1
Academic Search complete	4	1	1	1	0
ERIC	2	2	2	1	0
Total	199	135	73	56	12

TABLE IV. SELECTED PAPERS FOR REVIEW

Title (reference)	Authors	Year	Type	Journal or conference name	Language	Country
Experience of Analog Astronauts in Brazil: The Habitat Marte case study [27]	Araujo, Santos, Santos, Carvalho, Rezende	2022	Conference	Proceedings of the International Astronautical Congress, IAC	English	Brazil
Professional Roles, Skills And Competences Of Female Engineers In The ICT Industry: A Case Study In Chile [35]	Bustamante, Diaz, Hochstetter	2022	Conference	Proceedings - JICV 2022: 12th International Conference on Virtual Campus	English	Chile
Do you see what happens around you? Men's Perceptions of Gender Inequality in Software Engineering [34]	Canedo, Rocha, Silva, Santos, Mendes	2023	Conference	ACM International Conference Proceeding Series	English	Brazil
Challenges Women in Software Engineering Leadership Roles Face: A Qualitative Study [33]	Kohl, Prikladnicki	2021	Conference	International Conference on Enterprise Information Systems, ICEIS – Proceedings	English	Brazil
Work in progress: Addressing barriers for women in STEM in Mexico [32]	Lappe, Torales-Sanchez, Fuentes Caratozzolo	2021	Conference	IEEE Global Engineering Education Conference, EDUCON	English	Mexico
Women in engineering: Addressing the gender gap, exploring trust and our unconscious bias [37]	Strachan, Peixoto, Emembolu, Restivo	2018	Conference	IEEE Global Engineering Education Conference, EDUCON	English	Brazil, Portugal, UK
Female Professional Trajectories in Male Labor Markets: Female Engineers in the Maquiladora Industry [31]	Alfaro	2001	Journal	Revista Mexicana de Sociología	Spanish	Mexico
Gender, engineering, and professional technical education [36]	Buquet Corleto, Moreno Esparza	2021	Journal	Education Policy Analysis Archives	Spanish	Mexico
Critical examination using business intelligence on the gender gap in information technology in Brazil [39]	Gallindo, Cruz, Moreira	2021	Journal	Mathematics	English	Brazil
Women engineers in construction: The feminization possible and gender discrimination [29]	Lombardi, Renesto	2017	Journal	Cadernos de Pesquisa	English	Brazil
Latin American women in chemical engineering: Challenges and opportunities on process intensification in academia/research [30]	Ramirez-Corona, Calleja, Segovia-Hernandez, Aristizabal-Marulanda	2022	Journal	Chemical Engineering and Processing - Process Intensification	English	Latin America (Not specific country)
Women in construction: shortcomings, difficulties, and good practices [28]	Regis, Alberte, Lima, Freitas	2019	Journal	Engineering, Construction and Architectural Management	English	Brazil

the study [36]. Two studies included methodological techniques in their theoretical framework techniques in their theoretical framework sections; however, these techniques are more apt as methods for data collection and analysis rather than theories guiding the study [33,39]. Four papers referenced theories within the literature review, but failed to specify if these theories informed the research [28,29,31,35]. The remaining five papers neither included a theoretical framework section nor discussed any theory within the literature review.

2) *Research Methods*: Detailed reporting of research procedures is essential as it provides context for how sources of evidence were collected and analyzed. Specific descriptions of data collection and analysis enhance transparency regarding potential biases, enable the reproduction of the study in other contexts, and facilitate readers in assessing the transferability of findings to their own contexts [40]. Four papers provided a detailed description of the research methods employed, including participant recruitment and characteristics, instruments or questions used for data collection, and description of data analysis procedures [28,30,33,34]. Three papers reported data collection procedures but omitted data analysis reporting; these three studies utilized quantitative research approach and presented results using descriptive

statistics [27,32,39]. The remaining five papers mentioned the sample population in terms of participant numbers and demographic characteristics but did not include data collection and analysis procedures.

3) *Internal consistency and conclusions' support*: We evaluated the alignment between problem identification, research questions or study purpose, research methods employed, and interpretations and conclusions drawn from findings [40]. Considering that most studies lacked a theoretical framework to guide the study, we did not evaluate alignment with theory. Overall, problem identification and research questions or purpose exhibited alignment across all twelve papers. Each paper situated its research within existing literature and justified the need to explore gendered experiences or inequalities in Latin American working environments. Regarding alignment of procedures and results interpretation, three papers demonstrated good internal consistency [28,32,33]. The research methods in these three papers were appropriated for the study's purpose, and conclusions were drawn from discussions and interpretations supported by evidence. Three papers exhibited partial internal consistency, where alignment existed between study purpose and research methods, but some conclusions lacked supporting evidence [30,34,39]. The

remaining six papers lacked consistency due to absence of research procedures, discussions focused on previous literature without relating it to the study's results, or conclusions unsupported by evidence from the study.

E. *Synthesis*

Findings from the six papers that demonstrated some degree of internal consistency, with conclusions supported by evidence, were categorized into four themes regarding women's experiences in Latin American engineering workplaces. We describe each theme further as it is based on reviewed literature.

1) *Engineering working environments as men's domains:* Engineering is portrayed as a domain where men establish the rules, presenting obstacles for women seeking to enter and be accepted by the field. In the Software Engineering field, Khol & Prikladnicki [33] stated "Women want to occupy positions that men traditionally occupied. However, there is also a sensation that women can occupy those roles when 'authorized'" (p. 209), which points to women seen as occupying roles that are not meant to them. In the Chemical Engineering sector, women meet difficulties to enter male dominated positions, even with strong credentials [30], while facing discrimination in job opportunities based on gender [32]. In sectors like construction, where women are significantly underrepresented, male preference persists, affecting women's prospects for employment [28]. For instance one participant stated that "The manager valued the satisfaction of the male workers already working at the site, and when a woman entered their work environment, it meant that a male workmate, friend or family member was losing his position to her" [28 p.2540], which illustrates the high barriers a woman faced when attempting to enter the field. These barriers extends to leadership roles, with fewer women holding such positions compared to men, as documented by Lappe, Torrales-Sanchez, Fuentes & Caratozzolo [32] in different Engineering fields. Canedo, Soarres, Silva, Santos & Mendes [34], in the Software Engineering sector, also reported a low representation of women in leadership position in software development projects. Furthermore, they found that more women than men migrate from coding positions to documentation and testing positions, even though women expressed that coding was the activity that enjoyed the most. Gallindo, Cruz & Moreira [39] found an increase of women's underrepresentation in Brazil's *Information and Communication Technology (ICT)* field, contrasting with trends in developed countries. Yet, Ramírez-Corona, Calleja, Segovia-Hernandez & Aristizabal-Marulanda [30], in the Chemical Engineering field, reported that participants perceived an increase in women's participation in research teams in Colombia and Mexico. Women found that having mentors is critical for their career trajectories, however, given the low representation of women in the field, most of their mentors are men [30] and there is a lack of female role models [32].

Finally, Regis, Alberte, Lima & Freitas [28] identified additional barriers to entry in the construction field. For example, they reported managers' concerns about the cost of

adapting construction site facilities to accommodate women, dismissing them as "unnecessary costs" for a few women. The authors conclude that women are better accepted into projects when included from the project's start rather than being incorporated later.

2) *Discrimination, harrasment and recognition denial in the workplace:* Women facing discrimination, harrasment and lack of recognition is prevalent as highlighted in the findings of the reviewed papers. Lappe, Torrales-Sanchez, Fuentes & Caratozzolo [32] reported in different fields of engineering, that women encounter various discriminatory behaviors, such as having their achievements undervalued, being denied deserved job opportunities and feeling isolated or ignored. Additionally, a majority of women (62%) in the same study reported experiencing a gender pay gap. Canedo, Soarres, Silva, Santos & Mendes [34] concluded that women's contributions in the software field, are often undervalued compared to men's. Also in the Software Engineering field, participants in Khol & Prikladnicki's study [33] expressed a desire for equal recognition and opportunities for growth as their male peers. They emphasized the importance of acknowledging the significance of women's work. Furthermore, they showed women face direct and derogatory forms of discrimination, such as being judge based on stereotypical expectations regarding their apperance, or being labeled as "dramatic" or "crazy" [33]. Some studies even documented overt discrimination and oppression. For instance, a participant's quote stated: "Structural sexism and even to be scolded for trying to fight against it." [33, p.210], which illustrates women being oppresed when trying to demand equality. In another study in Civil Engineering, "The engineer MA-F1 reported that she wanted to hire a woman for a job and her former boss replied that he did not want a pretty woman. She must hire an ugly woman, he said, because beautiful women are harassed with pick-up lines" [28, p. 2543], shows an overt discrimination in a recruitment process. Women were sometimes held responsible for harassment in the Civil Engineering sector [28]. For instance, new female workers may receive instructions on how to behave around male workers, while not such instructions were given to men. Moreover, managers in the construction sector acknowledged and normalized the harassment of women in the workplace. Conversely, in the software field, most men did not recognize the presence of gender discrimination among team members [34].

3) *The Strain of Balancing Professional Expectations and Household Responsibilities:* According to Khol & Prikladnicki's study in Software Engineering work environments, women continually feel the need to prove themselves [33]. Additionally, women from different engineering sectors, are disproportionally burdened with household tasks and childcare responsibilities compared to men [32], leading to exhaustion. This pressure to balance professional expectations and household duties is exemplified

by a participant's statement: "As a woman and mother, I need to prove myself much more. If a man and a woman perform the same task and are successful, the man will be praised and promoted for it, while the woman will be criticized, and her outcome will be judged with suspicion" [33 p.210]. This participant who worked in Software engineering, felt the double burden of being a woman and having childcare responsibilities, and even though she needed to prove that her circumstances did not affect her performance, her work was undervalued. Participants in construction sites also reported adopting masculine behaviors to gain respect in the workplace [28], further compounding their burden.

4) *Resilience and Motivation.* Despite encountering barriers to entry and facing experiences of discrimination, harassment and inequalities, women remain in the engineering field for various reasons. Khol & Prikladnicki [33] reported that women in the Software Engineering field, acknowledge their crucial role in paving the way for other women, and are committed to the gender diversification of the field. Regis, Alberte, Lima & Freitas [28] found that women in their study felt proud of working in construction, viewing it as an achievement and a conquest of space for women. Finally, Ramírez-Corona, Calleja, Segovia-Hernandez & Aristizabal-Marulanda [30] highlighted how women stayed in the Chemical Engineering field to develop new skills and knowledge, inspire other women and contribute to their countries.

IV. DISCUSSION OF RESEARCH QUESTIONS

We found four overarching themes concerning women engineers' experiences in Latin American workplaces, which informed the research questions addressed through our systematic literature review.

A. *What insights does existing literature offer regarding women engineers' experiences within engineering work environments in Latin America?*

Despite having equal capabilities to men in the engineering field, women encounter persistent barriers when attempting to enter the job market. Throughout the reviewed literature, women reported facing gender discrimination during their job searches [30,32,33], and in some sectors, the preference for hiring men over women in traditionally male-dominated positions was openly acknowledged [28]. These barriers extend to women trying to reach leadership roles or specialize in technical skill such as coding [32,34]. Even some women reported that they can occupy leadership positions only when men agree to it [33]. While recognizing the importance of having mentors [30], women engineers lack female mentors due to their underrepresentation in the field [32,34,39]. Particularly notable was the finding from the study with the largest sample in our review, which revealed a decreasing trend in women's representation in the ICT sector in Brazil, contrasting with trends observed in developed countries [39].

Regarding workplace discrimination and harassment, a prevalent theme emerged in the undervaluation of lack of recognition of women's work compared to that of their male

counterpart [32–34]. Instances of gender pay gaps and limited opportunities for growth were also identified [34]. The presence of harassment was striking across the studies, with women receiving stereotypical and sometimes overtly derogatory comments and mistreatments [28,33]. In some cases, women were unfairly held accountable for not inciting harassment [28], and their efforts to combat sexism were minimized or penalized [33]. Additionally, instances of harassment were in some cases acknowledged and normalized [28]. Some studies found that discrimination went unnoticed by both men [34] and women [30].

Women in the studies had additional burdens compared to men, such as the constant need to prove themselves at work, exerting more effort than their male peers to receive equal recognition and shouldering a greater share of household tasks and childcare responsibilities [32,33]. In some cases, adopting masculine behaviors was seen as necessary for success in the workplace [28], further contributing to women's exhaustion [33]. Finally, in the construction sector, accepting women in sites was seen as a burden as it was necessary to adapt facilities for them, instead of seeing women participation in a project as a benefit. These attitude toward women's participation increased the feeling of exclusion.

B. *What understanding can be gained concerning women's intention to leave the engineering field within the Latin American context?*

While our review did not yield specific findings related to women's intentions to leave the engineering workforce, two studies highlighted women transitioning from technical roles to more administrative positions. One engineer cited long working hours on construction sites as the reason for the shift to an administrative role [29], and Canedo, Soarres, Silva, Santos & Mendes [34] reported many women moving to documentation and testing positions, even if overall, women were motivated by coding activities.

Conversely, regarding reasons for persisting in the field, the literature emphasized women's motivation to inspire and pave the way to other women, advance their technical skills and contribute to their countries' progress.

V. LIMITATIONS

We acknowledge several limitations in this systematic review. First, relevant papers may have been excluded due to limitations in our search. For instance, we excluded papers in Portuguese, the national language of Brazil, as neither of the authors are fluent in that language. Additionally, constraints in the search string may have impacted the identification of relevant studies; for example, articles lacking the terms "woman" or "women" in the title, keywords or abstract might have been overlooked. The necessity of including a "NOT" criterion within the search string to exclude articles from academic settings may have excluded papers that addressed both academic and professional contexts.

In our attempt to identify papers from Latin America, we relied on the country filter available in the databases, which may have led to the exclusion of studies conducted in Latin America but not affiliated with Latin American institutions. Furthermore,

our search might have overlooked papers published in journals or conferences that are not indexed in the databases used.

Moreover, the search process was conducted solely by one of the authors, though under the guidance of the second author, which might have increased the risk of bias in the application of inclusion and exclusion criteria.

Publication or reporting bias could have potentially influenced the findings presented in this review, such as the selective reporting of findings that align with the study's purpose or hypothesis. To mitigate this limitation, we attempted to counteract bias by assessing the quality of the studies and adjusting our conclusions accordingly.

VI. CONCLUSIONS & RESEARCH RECOMMENDATIONS

Our systematic literature review aimed to establish a baseline of the existing literature concerning women engineers' experiences in Latin American workplaces. Despite encountering limited literature, we gained valuable insights from various perspectives. Firstly, regarding the characteristics of the papers, a notable observation was the predominance of publications in English. The latter is due to the requirement of major conferences and journals to submit papers in English, however it reduces the accessibility and impact of findings, as they may be less accessible to organizations and populations interested in Latin American issues. Additionally, a significant proportion of the papers originated from Brazil, possibly reflecting Brazil's higher investment in research compared to other countries in the region. We observed a weakness in the research methods employed in the reviewed studies. Specifically, a majority of the studies lacked a theoretical framework to guide their research, and half of them did not adequately report their research methods or demonstrated internal consistency within their research design and procedures. This deficiency limits drawing relevant conclusions, identifying future actions, and addressing the root causes of gender inequalities in the engineering field. Furthermore, it hinders efforts in assessing results quality, reproducibility, conducting meta-analysis, and constructing common knowledge within the region. From our mapping and critique of the papers, we conclude that advancing towards gender equality in the engineering field needs increasing research across all Latin American countries, increasing publications in Spanish, and enhancing research quality.

Regarding our research questions, our systematic review provided insights into women's experiences in Latin American workplaces. Notably, the literature revealed a concerning trend of decreasing women's representation in the ICT sector in Brazil compared to developed countries. This finding needs further investigation across other countries and engineering fields, to better understand this phenomenon.

Furthermore, instances of overt gender discrimination reported in the studies, particularly in the construction sector, reflect deeply ingrained sexist cultures in Latin America and underscore the urgent need for policies and enforcement mechanisms to prevent, address, and penalize workplace discrimination. It is alarming that women in the construction field were held accountable for harassment, with supervisors

acknowledging and normalizing such situations. These findings underscore the imperative of increasing education and awareness in workplaces concerning gender inequalities. The literature did not address issues related to women's intentions to leave the engineering field, showing that the larger project that frames this literature review may be the first to be conducted in the region.

Finally, we extend our appreciation to the authors of the twelve papers included in this review, for their dedication to understanding women's experiences in engineering and their contributions to advancing women in the field.

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