Barriers to Construction Careers for Female Student's in Indonesia: A Quantitative Study.

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ABSTRACT: *This study arises from the problems women face when deciding their career direction and developing work in the construction sector, especially in relation to Indonesian female students' interest in this field. The study was conducted using a qualitative descriptive method by reviewing 8 peer-reviewed academic publications published between 2017–2025, with research sources coming from various countries discussing women's experiences working in construction. The review results show various issues that can affect women's career paths, ranging from gender-based views, workplace habits, work situations, and balancing work and personal life, to physical demands, safety aspects, and limited access to mentoring and career advancement. Out of many issues, there are three that come up the most: gender bias, cultural and work environment conditions, and difficulties in balancing work and personal life. Technological changes in the Industry 4.0 era, including the use of Building Information Modelling and the implementation of autonomous construction systems, also open up opportunities for women to enter this field because several new jobs rely more on tech skills and digital proficiency than physical strength. This study can serve as an initial reference to understand how Indonesian female students view the construction field, including the reasons that might influence their interest in choosing this sector as a future career.*

KEYWORDS - *barriers, career development, construction industry, gender stereotype, women*

I. INTRODUCTION

The progress of national development is often supported by the construction industry because the demand for public facilities keeps increasing, and the use of technology requires workers who have skills in line with the times. But the workforce in this field is still mostly male, making women's opportunities to enter the construction profession and advance their careers often clash with many obstacles

Many studies have found that the low involvement of women in the construction field is related to a professional environment that still presents many obstacles, ranging from biased gender views, organizational habits, job situations, to limited opportunities to receive guidance for career advancement. Yusna and Deanggi (2025) found that women pursuing civil engineering face rules and work patterns that are unsupportive, high workloads, and certain assumptions about women's abilities that can hinder their professional journey. Alias et al. (2025) identified company culture, difficulties in getting and keeping leadership positions, and gender bias as problems frequently experienced by female workers. Anuar et al. (2017) also linked these issues to family obligations, personal demands, work environment, sexual harassment, and working hours that are hard to adjust.

Technological advancements in the Industrial 4.0 era have brought a transformation in the way work is done in the construction industry, especially since the use of digital technology, then automation, up to Building Information Modelling (BIM) has continued to develop. Al Salaheen et al. (2024) think that this situation could open up more opportunities for women because the workforce demand is starting to shift towards skills in operating technology and managing projects, not just work that relies on physical strength. Even so, the notion that construction is a man's domain still hinders women's interest.

A series of findings from previous studies show that issues of equality and job opportunities for women in the construction industry appear in many countries. On the other hand, studies that specifically examine the situation of Indonesian female students are still rare. This study is conducted to map out the many causes that could minimize Indonesian female students' interest in construction professions, looking at the factors most frequently discussed in previous research, and then exploring women's views on the opportunities to enter the industry and the likelihood of career advancement in the future

II. PRATICE METHOD

This study uses a qualitative descriptive approach with materials in the form of secondary sources from eight academic publications discussing the challenges women face in the construction sector. References were searched through several scientific databases using keywords like women in construction industry, female construction engineers, barriers women construction industry, and women career industrial revolution 4.0 as the basis for selecting sources

The selection of references refers to the relevance of the topic, namely writings that discuss women's issues while working in the construction field, published in reputable academic journals with a peer review mechanism, and from the period 2017–2025. The eight articles used represent Malaysia, then Australia, followed by South Africa, Nigeria, up to Jordan, making the study results able to show cross-country challenges as well as differences arising from the social and cultural characteristics of each region.

The study process started by defining the focus of the discussion and determining the search terms, then continuing with sourcing materials, filtering publications according to the rules, noting important information from each article, and mapping the results based on discussion similarities. The mapping results were divided into issues like gender, workplace culture, work-life relationship, access to mentoring, skills and professional advancement, physical safety, and technological progress. Findings from eight articles were then reviewed comparatively to develop insights into the challenges and opportunities for women building careers in construction

III. RESULT AND DISCUSSION

The review results show that issues facing women in the construction industry don't stop at mastering job skills, but involve several interconnected aspects. A summary of the eight articles that were studied is outlined in Table 1

Table 1 Summary of Literature Review

No.	Author	Main Findings and Barriers
1	Yusna & Deanggi [1]	Women in civil engineering face gender bias, challenging work environments, limited mentoring, and work–life balance issues.
2	Alias et al. [2]	Women’s leadership and career motivation are affected by organizational culture, gender stereotypes, career balance, and competence requirements.
3	Owolabi et al. [5]	Female construction graduates face gender profiling, academic

		competence requirements, and limited career support.
4	Anuar et al. [3]	Women's involvement in construction is influenced by family commitments, work environment, sexual harassment, and long working hours.
5	Bryce et al. [6]	Female engineers experience barriers to career advancement due to inflexible work cultures, long working hours, and work–life balance challenges.
6	Windapo et al. [7]	Women's career choice and progression are influenced by male dominance, gender bias, workplace culture, and gender policies.
7	Oladinrin et al. [8]	Women's entry and retention are affected by limited career information, male dominance, and discriminatory work environments.
8	Al Salaheen et al. [4]	Industry 4.0-related careers present challenges including fear of heights, work–life balance, physical risks, and hazard exposure.

Issues related to gender-based views are among the most commonly found findings in many studies. Anuar et al. [3] explained that construction work is still often seen as a field mainly associated with male workers. Windapo et al. [7] found that the dominance of male workers and gender biases influence women's decisions when choosing a profession or developing their careers in South Africa's construction industry. Such perceptions can then limit women's beliefs in their job opportunities and prospects for professional advancement.

The company's internal situation can affect how women carry out and develop their work in the construction sector. Alias and colleagues [2] found that the cultural patterns that develop in organizations become one of the problems when women hold leadership positions, while Bryce and colleagues [6] found that inflexible work rules combined with long working hours can be obstacles for female engineers in Australia to achieve better career development

The issue of dividing time between work demands and life outside of work often comes up in research findings. Anuar et al. [3] along with Bryce et al. [6] highlighted this issue based on qualitative studies, and then Al Salaheen et al. [4] provided evidence based on quantitative measurements with a relative importance index of 0.772, making this aspect one of the two constraints with the biggest impact. This value reflects that respondents actually feel the difficulty of managing both areas.

Safety aspects at project sites and the demands of work that align with physical conditions are also considerations for women when choosing a profession. According to a study by Al Salaheen et al. [4], their fear of heights scored a relatively high importance index of 0.785, followed by issues of managing time between work and personal life. These findings don't mean that women are less capable of carrying out field activities, but rather serve as considerations for companies to create working conditions that can accommodate the needs of the workforce more broadly

Technology transformation could be a way to increase women's involvement in the construction industry because some tasks that used to require physical effort are now being replaced by digital systems. The use of Building Information Modelling (BIM), Augmented Reality (AR), Virtual Reality (VR), Unmanned Aerial Vehicles (UAV), and

autonomous construction systems are all part of this development. Al Salaheen et al. [4] noted that advanced building materials with a relative importance index of 0.831 and autonomous construction at 0.806 are technologies considered to support women's career paths, especially in modeling work, project management, and other digital-based activities

The sustainability of women's careers in the construction industry is also influenced by an environment that provides proper guidance, opportunities, and support. Yusna and Deanggi [1] emphasize the need for institutional policies that support women and leadership styles that are open to diversity, while Owolabi et al. [5] point out that limited career development assistance is one of the challenges female graduates face when choosing an academic path. Basically, women's involvement from the education stage doesn't necessarily continue into a developing career if support from campuses and professional environments is still limited.

Overall barriers and opportunities in women's construction careers are closely linked. Stereotypes shape how the profession is perceived, organizational culture shapes the day-to-day experience of work, and long hours combined with little flexibility affect whether a career can be sustained. At the same time, technological change, mentoring, and competence development may help broaden women's participation in the industry.

IV. Conclusion

This review of eight scientific articles shows that the barriers women face in choosing and developing a construction career have many dimensions. They include gender stereotypes and bias, organizational culture, working conditions, work-life balance, physical condition and occupational safety, and limited support and career development opportunities. Three of these were identified most consistently in the literature: gender stereotypes and bias, organizational culture and working environment, and work-life balance.

Industrial Revolution 4.0 also opens new routes for women into the industry, through digital skills and jobs that no longer depend only on physical work on site. Raising women's participation in construction will therefore take several things together: stronger individual competence, support from educational institutions, an inclusive workplace, real opportunities for career development, and the use of modern construction technology.

This study has limitations. As a literature review, its findings depend on what the analyzed articles report, and most of those articles come from countries other than Indonesia. Future research should survey female civil engineering students in Indonesia directly, to get a more specific empirical picture of the barriers they see and their career interests.

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