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BREAKING BARRIERS: THE IMPACT OF EARLY CAREER EXPERIENCES ON THE LONG-TERM SUCCESS OF FEMALE ENGINEERS IN SRI LANKA

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ABSTRACT

This study explores the early career experiences of thirteen pioneering senior female engineers in Sri Lanka, employing a qualitative methodology with a purposive sampling approach to illuminate their unique journeys within a male-dominated profession. Through an in-depth analysis of personal narratives, the research provides critical insights into their professional roles, the challenges they encountered, and their contributions to the engineering field. Thematic analysis identifies key themes, including Gender Based Challenges, Workload and Resource Constraints, Leadership and Resilience, Mentorship and Support to navigate systemic and cultural barriers. The findings highlight the necessity of implementing gender-sensitive workplace policies and structured mentorship programs to support and empower women in engineering. By shedding light on previously underexplored aspects of gender dynamics in engineering, this study underscores the urgent need for gender sensitive workplace policies and structured mentorship programs to foster inclusivity. By addressing gaps in the current professional landscape, this study contributes significantly to the growing body of literature on gender equity and professional development, particularly within the Sri Lankan engineering context. Furthermore, this study serves as a foundation for ongoing research into the long-term career progression of female engineers, the effectiveness of emerging gender equity initiatives, and the evolving role of women in engineering leadership.

KEYWORDS: *Women Engineers, Sri Lanka, Gender, Engineering Careers, First Jobs*

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1. INTRODUCTION

The engineering profession plays an important role in the development of global technology and social progress. However, the majority of the population is male, with women often underrepresented and facing systemic challenges (Samanmalie and Anjalika, 2023). In countries such as Sri Lanka, the gender gap is particularly apparent, where cultural and social norms have historically restricted women's participation in the fields of science, technology, engineering and mathematics (STEM) (Sax *et al.*, 2016). Despite these obstacles, Sri Lankan women engineers have gradually built a space for themselves and contributed to the profession through their skills and leadership. Their stories of perseverance, resilience, and innovation provide a critical understanding of the relationship between gender and the role of engineering professionals (Makarem and Wang, 2020).

This study explores the early career experiences of Sri Lankan female engineers, a pivotal stage that plays a defining role in shaping their long-term professional trajectories. Through an in-depth analysis of their personal narratives, the research examines the challenges they face, the strategies they employ to navigate obstacles, and the broader implications for fostering a more inclusive engineering industry (Diana Bilimoria, Simy Joy, 2006). At the core of this investigation is the problem statement: "How do early career experiences contribute to the professional success of female engineers in Sri Lankan industrial sector?". By addressing this problem statement, the study provides a nuanced understanding of the personal and institutional factors that shape the professional integration and advancement of women engineers in Sri Lanka.

The core objectives of this investigation include:

1) How do early career experiences influence the professional growth of female engineers in Sri Lanka's industrial sector?

2) What are the challenges faced by female engineers during the early stages of their careers and their impact on long term success?

3) What are the recommendations for improving early career support systems to enhance the professional success of female engineers in Sri Lanka?

By addressing these objectives, this research seeks to contribute to the broader conversation on diversity and inclusion within the engineering industry, providing a foundation for future work in this area. The findings provide a nuanced understanding of the personal and institutional factors influencing the professional integration of women engineers in Sri Lanka.

2. LITERATURE REVIEW

In various countries and cultures, the under representation of women in engineering and other areas of science, technology, engineering and mathematics (STEM) is widespread. This distinction is often attributed to systemic barriers, social expectations and gender biases in the educational system, workplace environment and broader cultural contexts (Thelma and Ngulube, 2024). The literature reveals that these challenges begin as early as childhood and extend into higher education and professional settings.

2.1 Women in Engineering: Global Perspectives

Worldwide, women are historically under-represented in engineering. Research by (Pokhrel, 2024) indicates that this lack of representation stems not only from social prejudices, but also from the lack of role models and mentors in this field. Similarly, (Saumyadi and Jayawardane, 2022) argues that the workplace environment often lacks adequate support for women engineers, which contributes to high unemployment rates.

Studies in countries like India and China indicate that cultural and structural factors significantly influence women's participation in engineering. For instance, while many women may doubt their technical abilities, organizational policies often fail to address their specific needs (McPherson, 2024). These findings are consistent with the experience of women engineers in Sri Lanka who face similar sociocultural challenges (Menezes, 2018).

2.2 The Role of Mentorship and Leadership

The importance of mentoring for the development of women engineers' careers is a recurring theme in literature. It emphasizes that mentorship programs can help women overcome workplace challenges by providing guidance, encouragement and advocacy (Lin et al., 2019). In areas dominated by men, especially in women, there are often no informal support networks. In addition, it should be noted that mentoring positively affects job satisfaction and career development, underlining its role in retaining women in STEM careers (Bhatia and Amati, 2010).

Leadership qualities of women engineers are also the focus of research. Women in the engineering leadership role exhibit higher empathy and resilience, qualities that are essential to foster inclusive work cultures (Schmitt, 2020). This is consistent with the findings (Benschop Yvonne and Verloo Mieke, 2011), which highlight how women leaders often act as catalysts for change, to address systemic inefficiency and to improve the dynamics of the workplace.

2.3 Gender-Based Challenges in the Workplace

Gender-based bias and discrimination remain a major obstacle to women in engineering. Studies (Mitiku, Tamrat and Adaye, 2023) and (Tshilongo, 2023) show that women often face open and concealed gender-based challenges, including limited resources, exclusion from critical decision making processes, and harassment. These challenges are exacerbated in resource limited environments where women often have to assume additional responsibilities to prove their competence. Literature also emphasizes the impact of social perceptions on women's careers (Ettinger, Conroy and Barr, 2019) and points out that traditional gender roles often place women's expectations excessively and force them to balance their professional and personal responsibilities. This double burden may impede their career growth, especially in demanding fields such as engineering.

The literature also highlights tensions created by traditional gender roles, which place disproportionate expectations on women to balance professional and domestic responsibilities (Mitiku, Tamrat and Adaye, 2023). This “double burden” can constrain career mobility, particularly during early career stages, when professional growth demands high time commitments. While prior studies describe these challenges broadly, few examine how they are experienced subjectively by women in their first job roles, reinforcing the need for narrative-based exploration.

2.4 Women Engineers in Sri Lanka

Studies in Sri Lanka provide valuable insight into the unique challenges and opportunities faced by women engineers. Although in recent years women have entered engineering, the workplace environment remains predominantly male-dominated (Chew, Atay and Bayraktaroglu, 2020). This highlights that social norms and expectations often discourage women from pursuing a long-term engineering career despite their qualifications and capabilities. In Sri Lanka, the role of mentorship and institutional support is also evident. The research emphasizes the need for targeted interventions such as mentoring programmes and gender sensitive policies to support engineers in their early careers. These conclusions highlight the importance of creating inclusive workplaces that recognize and address the unique challenges faced by women in engineering.

2.5 Thematic Connections to the Current Study

The present study is based on existing literature, focussing on the first job experience of women engineers in Sri Lanka. Previous research has focussed mainly on systemic obstacles and workplace dynamics, but this study provides a narrative-based exploration of individual experiences (Falzon, 2023) and reveals the interaction between individual agency, institutional support, and social factors. This study helps to better understand how women engineers navigate their early career paths by highlighting gender-based challenges, mentoring, and leadership and resource constraints.

3. METHODOLOGY

This study is part of an ongoing qualitative research that investigates the career success of Sri Lankan women engineers in a grounded theory based approach. The paper aims to determine the early career experience of female engineers in Sri Lanka, aimed at developing a thematic framework that

captures their unique challenges and contributions in a field dominated by men. Grounded theory is known for its ability to produce theories directly from data, which is used to identify patterns and relationships between individual experiences and wider structural factors (Wijesinghe and Jayawardane, 2024). Thirteen participants from the various engineering sectors of academia, public works, manufacturing, and management were selected in a target sample to ensure that the data are integrated into various professional contexts. Given the ongoing nature of the research, additional participants will be included in subsequent phases to build on and refine the emerging findings. This approach ensures that the emerging framework is based on a variety of perspectives and conforms to the best practices of qualitative research as an open study (Rai and Thapa, 2019).

Thirteen senior female engineers with more than ten years of professional experience shared the reflection of their career paths. Semi-structured interviews were conducted in virtually 60 - 90 minutes to promote open dialogue and capture nuanced perspectives (Broom, 2005). These interviews were recorded with the consent of the participants and converted verbatim into Microsoft Word files for analysis to achieve the objectives of the study.

Thematic analysis, as described (Braun and Clarke, 2019), has been used to identify recurring patterns and key themes of data. This process included iterative cycles of familiarization, coding, categorization, and theme development. Nvivo 12 qualitative analysis software was employed to organise codes and support systematic theme generation. A thematic map was developed to visually illustrate the interconnections among themes, particularly those relating to gender based challenges, leadership development, resilience and the role of mentoring during early career stages.

Ethical procedures were rigorously followed. Confidentiality was safeguarded through anonymization, participation was entirely voluntary, and the rights and welfare of participants were prioritized throughout the research process (Mootz *et al.*, 2019).

To improve the trustworthiness of research, triangulation was used to cross check the results in narratives, members were vetted to validate interpretations with participants, and rich and thick descriptions were provided to facilitate transferability (Strauss and Corbin, 1994). Although the small sample size and the retrospective nature of the study present limitations, this methodology is consistent with established qualitative research practices and provides valuable information on the early career experience of Sri Lankan women engineers.

4. RESULTS & DISCUSSION

The interviewees came from a variety of engineering fields including Electrical, Materials, Textile, Civil, Electronic and Bio medical Engineering, and each has over 10 years of relevant industrial experience. At the time of the study, they were serving in highly responsible positions within their respective

Table 1: Demographic Information of Interviewees

Participants	Years of professional Experience	Current Employment Status	Educational Qualifications	Field of Work
A	33	Retired	BSc.Eng Hons	Electrical Engineering
B	18	Entrepreneur	BSc.Eng Hons, PGDM & PQMP (Japan – AOTS)	Materials Engineering
C	29	Employed Full Time	PhD, MPhil, BSc.Eng Hons,	Textile Engineering
D	37	Retired	PhD, CEng , BSc.Eng Hons,	Civil Engineering
E	10	Employed Full Time	BSc.Eng Hons / MBA	Electronic & Telecommunication Engineering
F	30	Employed Full Time	CEng, BSc.Eng Hons	Chemical Engineering
G	30	Employed Full Time	BSc.Eng Hons	Civil Engineering
H	11	Employed Full Time	BSc.Eng Hons, MBA	Electrical Engineering
I	19	Entrepreneur	BSc.Eng Hons, CIMA	Electrical Engineering
J	16	Employed Full Time	BSc.Eng Hons, MBA	Electronic & Telecommunication Engineering
K	17	Employed Full Time	BSc.Eng Hons, MBA	Electronic & Telecommunication Engineering
L	8	Employed Full Time	BSc.Eng Hons	Chemical Engineering
M	13	Employed Full Time	BSc.Eng Hons, MBA	Bio medical Engineering

organizations, such as Directors, Chief Executive Officer, Deputy General Manager, Senior Manager, Chief Engineer, and Head of Department.

4.1 First Job Roles and Experiences

The first job of each participant was a major step towards engineering career and a key step in his professional career. These initial experiences not only posed them with technical and operational requirements, but also presented unique challenges and opportunities that significantly influenced their career paths. These women have encountered situations that have tested resilience, adaptability, and problem-solving skills, from navigating the complexity of male-dominated workplaces to demonstrating their capabilities in resource-limited environments.

At the same time, these roles provide valuable learning opportunities, enabling them to develop their technical skills, assume leadership responsibility and implement innovative solutions. The diversity of their experiences highlights the diversity of their early career, which often intersects with systemic Challenges.

These statements emphasize the broader impact of equitable access to opportunities and support structures, such as mentorship, to empower engineers to develop and excel in their careers.

"*We did not have a clerk, typist, or technical officer. So we engineers had to go to the field to collect data, and we had to visit the survey department to obtain the geographical map. We also had to go to the field to mark the transformer lines. Almost every task had to be done by ourselves."* (Participant #A).

The first participant, who was employed by an electricity distribution company, was faced with a limited working environment, a lack of support staff and a wide range of tasks. Without access to clerical workers, typists or technical officers, she often had to move beyond the traditional scope of engineering tasks. These included field surveys, geographical maps from the field survey department and manual marking of transformer locations on the ground. From data collection to execution, every aspect of the work was directly under her control.

These early career challenges, though strenuous, proved instrumental in honing her technical acumen and developing her project management capabilities. By undertaking diverse tasks across various stages of the project lifecycle, she not only expanded her practical knowledge of engineering operations but also gained critical experience in logistical coordination and fieldwork. This hands on involvement with all aspects of the projects provided a solid foundation for her future roles, preparing her for leadership responsibilities and a career trajectory that would demand both technical proficiency and strong organizational skills. Ultimately, the necessity to perform multiple roles simultaneously not only sharpened her professional competencies but also instilled a sense of resilience and problem-solving ability that would be essential as she progressed in her engineering career (Kappali, 2013).

"Being a very thin and small girl and still serving as a factory manager was one of my turning points because I received a senior position immediately after my final year. It completely changed my personality." (Participant #B).

The second participant's appointment as a factory manager marked a ground breaking milestone in her career, particularly considering her young age and the prevailing gender norms at the time. Just after completing her final year of studies, she was entrusted with a senior position, a responsibility that would normally have been given to someone with far more experience. Her physical appearance described as a small and delicate figure added another layer of challenge, as it defied traditional expectations of authority in the industrial setting. This position not only marked a professional turning point but also catalysed a profound personal transformation, reshaping her leadership style and personality.

Managing 200 workers in the factory environment is not a small achievement, especially for a young woman in male-dominated industries. She faced considerable resistance and harassment, a common obstacle for women to take leadership roles in such environments. Despite these challenges, her proactive and powerful leadership style became an important factor in changing the factory culture. Through clear

expectations, open communication and unwavering professionalism, she has achieved a working environment that promotes mutual respect and cooperation. Her ability to navigate these obstacles not only improved workplace standards, but also highlighted the crucial role of resilience and vision in the elimination of gender-based obstacles.

"*We worked like a family, so I enjoyed my time there a lot. I learnt a lot. Even today, I teach civil engineering concepts that I learned from that experience"* (Participant #C).

The third participant's early career uniquely blended academia with industry, providing her with a diverse set of experiences that significantly enriched her professional development. Initially serving as an instructor in civil engineering at a university, she later made a strategic career shift into the apparel manufacturing industry, where she took on roles within the production and cutting departments. This transition exposed her to the intricacies of factory operations, where she gained first-hand experience in managing production processes, overseeing quality control, and ensuring efficient workflow.

Her ability to balance demanding shift work with personal responsibilities not only tested her time management skills but also offered profound insights into team dynamics and operational efficiency. Working in such a fast-paced and results driven environment, she learned how to optimize team collaboration, manage tight deadlines, and address operational challenges in real-time. These practical experiences, in turn, provided her with a broader understanding of both industrial operations and the application of theoretical knowledge in real world settings.

These lessons extended beyond the factory floor and had a lasting impact on her academic career. She often used her industry experience to enrich her civil engineering teaching courses. This blend of academic knowledge and industry experience improved her teaching and gave her students a more practical, real world understanding of the subject. Her early career experiences in both academia and industry thus served as a foundation for her future success, enabling her to make valuable contributions to both sectors (Kossek and Perrigino, 2016) .

"Although I was a woman, I used my postgraduate experience and I enjoyed the job. At ABC, Mr. Dias sent me for construction site inspections, and I carried out a lot of supervision work for telecom projects. I did the work just like any other engineer." (Participant #D).

The fourth participant's career journey began through a government service in the Public Works Department, marking the start of her significant contributions to the field of engineering. With a postgraduate education in hand, she quickly adapted to the professional environment and embraced the challenges of supervising construction projects. Her role included critical responsibilities, such as overseeing the design and execution of key infrastructure projects, particularly within the telecommunications sector. Notably, she was entrusted with site inspections and supervisory duties on construction sites, tasks typically dominated by male engineers. Her ability to perform these duties effectively was a testament to her expertise and confidence, as she approached her work with the same determination and professionalism as her male counterparts.

"It was a really challenging experience to work in male dominated factory" (Participant #E).

The fifth participant shared the challenges of working in a male-dominated factory, including workplace dynamics, implicit biases, and the struggle for recognition and inclusion. These experiences underscore the need for strategies that promote diversity, equity, and inclusion in industrial settings.

Despite systemic inefficiencies and persistent gender biases, her commitment to excellence and problem-solving allowed her to overcome these challenges. Rather than being discouraged, she contributed significantly to the project through innovative methods and strong work ethics, earning the respect of colleagues and supervisors. Over time, these qualities propelled her into a leadership role in electronic and telecommunication engineering, where she continued to demonstrate exceptional leadership and technical expertise. Her career path demonstrates how

resilience, combined with professional expertise, fosters success in traditionally male-dominated fields (Kossek and Perrigino, 2016).

"I got the job at the very end. Many people had already joined their jobs, and there were 48 students in the electrical batch. I was among the last group, around number 40 to 48, to receive the job." (Participant #I).

The ninth participant reflected on her journey to securing her first job as a female engineer, emphasizing the barriers she faced in a highly competitive selection process. Her experience underscores the additional challenges women often encounter in male dominated fields, where biases and limited opportunities can make career entry more difficult. Despite these obstacles, her perseverance and determination enabled her to succeed. This finding reinforces the broader theme of resilience in overcoming gender-based barriers, demonstrating that persistence, adaptability, and unwavering commitment are crucial for women striving to establish themselves in engineering and other technical professions.

"I was very lucky because within two weeks there was a paper advertisement for a Health and Safety Engineer. I applied for it, and they called me for the interview." (Participant #F).

The sixth participant's experience highlights the role of opportunity and timing in career advancement. Within two weeks, they found a job advertisement for a health and safety officer, applied, and were quickly called for an interview. This underscores the importance of proactive job-seeking and swift decision-making. It also reflects how external factors, such as job market conditions and recruitment practices, influence career growth.

"I did not face any obstacles in finding my first job. Immediately after passing out from the university, I became a teaching assistant at our university. I worked there for six months until I received the job at the Open University." (Participant #G).

Above findings show that some graduates easily find jobs without major challenges. The seventh participant secured a teaching assistant position at their university immediately after graduation. After six months, she moved to a role at the Open University, highlighting how early-career opportunities support job growth. This suggests that institutional support and networking can play a key role in a smooth transition to employment.

4.2 Themes from First Job Experiences

Female engineers often face unique challenges in their careers, ranging from workplace biases to limited leadership opportunities. Despite these obstacles, some have demonstrated resilience, excelling in technical roles, project management, and leadership positions.

Figure 1: Thematic diagram for Female Engineer's Early Career

4.2.1 Gender - Based Challenges

The participants often faced gender biases, from overt discrimination to subtle doubts about their abilities. For example, one participant observed harassment while working in a male dominated factory setting.

"There was a lot of corruption because the owner's brother dominated the company. I remember that during that time they committed an act of sexual harassment against a woman" (Participant #B).

The participant described corruption within the company, blaming the owner's brother for his dominant role. She also recalled incidents of sexual harassment against female employees, pointing out the toxic work environment and systemic issues, which went beyond financial misconduct to include unethical behaviors. To succeed in such work environments, women including female engineers, must possess strong determination and resilience. Senior officers may misuse their authority, sometimes demanding unethical favours for promotions. In such cases, female engineers must stand strong with courage and integrity.

"Female engineers have to put in a great deal of effort to reach the top positions where they truly prefer to work, especially in top management roles" (Participant #A).

Women engineers face a significant challenge to gain a high level of management, even in highly qualified areas and areas where they prefer to work. This is often due to systemic obstacles such as gender discrimination, inequalities in access to opportunities and the need to constantly exceed men's counterparts in order to gain recognition. Despite these obstacles, many women have shown remarkable perseverance and resilience, and have made considerable efforts to break through the "glass ceiling". These findings highlight the critical need for organizational policies and cultural changes that promote gender equality and support women in the role of leadership in the engineering and related fields.

"It was challenging because, as I mentioned, all the workers were male. At that time I was really young, and they had never seen female engineers at the factory." (Participant #B).

The participant faced challenges as a young woman in a male-dominated factory environment. With no prior exposure to female employees, the workers' initial resistance made it harder to gain acceptance. This reflects common barriers women encounter in traditionally male industries, such as bias and the need to prove their competence. To succeed in such an environment, a female engineer must demonstrate resilience, confidence, and adaptability to establish her role and thrive in the workplace.

Continuous learning and adaptability emerged as essential strategies. Participant "H" emphasized the importance of applying knowledge beyond routine tasks and investing in both technical and soft skills, while Participant "B" highlighted the need to avoid gendered labelling. Several participants expressed a preference to be recognized simply as engineers, without any qualifying descriptors. Participant "F" urged, *"Stop calling you as a woman engineer. Call yourself as an Engineer."* Similarly, Participant "M" argued that leadership identity should transcend gender:

"Don't think you are a female engineer. Only thing is you are an engineer." (Participant #M).

Such perspectives reflect strategies of professional assimilation, consistent with findings that women in male-dominated professions often downplay gender to enhance legitimacy. Collectively, these accounts suggest that leadership identity is sustained through adaptability, technical competence, and identity management strategies that resist confining gender stereotypes.

Female engineers face several challenges early in their careers that can affect their long term success. These include gender biases, limited mentorship, unequal opportunities and workplace policies that do not support work life balance. Additionally, societal perceptions and self doubt may impact their confidence and growth. Addressing these challenges is essential to creating an inclusive work environment that supports their professional development (Bansal, 2020).

4.2.2 Workload and Resource Constraints

In the context of resources limitations, participants had to perform tasks far beyond the defined roles. A participant explained that manual mapping of field data and technical logistics were unable to provide technical and administrative support due to a lack of technical support.

*"The beginning of my career was an experience that is difficult to fully explain, but it added great value to my future dreams. It was a very good foundation because I do not think anyone who is recruited as an engineer now would ever have the chance to do such things. "(*Participant #A).

The first participant reflected on the early stages of their career, describing the experience as profoundly impactful and instrumental in shaping their future aspirations. They emphasized the unique value these experiences brought to their professional growth, highlighting how the hands on nature of their initial roles provided a foundation for their long-term dreams. Furthermore, the participant observed that such formative opportunities are increasingly rare in contemporary engineering roles, suggesting a shift in how entry-level engineers are engaged and trained.

This commentary underscores the importance of practical, immersive early career experiences in fostering skill development and long term career success in the engineering profession.

"After I had my children, my time became limited because I had to spend more time with them. Motherhood is something we cannot experience again, so I had to give it priority. Because of that, I faced some difficulties. During those days, having three children was also challenging until they became at least five years old. That was my main challenge as a lady engineer." (Participant #B).

The second participant highlighted the significant impact of motherhood on their professional journey, particularly in the engineering field. They explained that after having children, their available time became constrained as they needed to dedicate considerable attention to their young children. Emphasizing the irreplaceable nature of motherhood, she prioritized spending time with their children during their early developmental years. However, this decision was not without challenges. Raising three children simultaneously, particularly until they reached the age of five, posed substantial difficulties. Balancing the demands of caregiving with the professional responsibilities of an engineering career required immense resilience and adaptability. This narrative underscores the multifaceted challenges faced by women engineers in managing work-life integration and highlights the need for supportive mechanisms to enable better balance during critical life transitions.

*"Later I was promoted to Chief and was transferred to Colombo to the design office in 1972. From that year onward, I worked in the design office. We handled many important projects such as the Police Headquarters, the National Library, the National Arcades, and several other major buildings and large scale projects. "(*Participant #D).

The fourth participant's career progression highlights the significance of institutional opportunities and professional recognition in shaping an individual's contributions to national development. Their promotion to Chief and subsequent transfer to the Colombo design office in 1972 marked a pivotal moment, enabling them to engage with and lead high-profile projects. This period of their career was distinguished by involvement in the design and execution of iconic structures such as the Police Headquarters, the National Library, and the National Arcades, among other substantial public infrastructure projects.

This narrative illustrates not only the importance of individual expertise in the realization of such projects but also the collaborative efforts within design offices that translate ambitious architectural visions into functional realities. Future research could delve deeper into the institutional frameworks and policies that supported professionals like Participant #4, exploring how these factors facilitated the successful execution of large scale projects and influenced urban development in Colombo during this transformative era.

4.2.3 Leadership and Resilience

Leadership emerged as a defining trait in the narratives. Participants demonstrated resilience in overcoming systemic inefficiencies and workplace challenges. One participant implemented welfare programs and streamlined operations, significantly improving workplace conditions.

"When I entered the factory, the security personnel saluted me. I received that kind of respect, and at that moment I felt that I was a mature person with many responsibilities." (Participant #B).

The second participant provides valuable insights into the role of respect and recognition in shaping employees' perception of their identity and responsibilities. This reflects the psychological impact of workplace recognition on self-esteem and role commitment. Respect, as an organizational value, plays a pivotal role in fostering a sense of belonging and responsibility among employees. The participant's experience highlights how small gestures, such as a salute from security personnel, can contribute significantly to an individual's self-perception as a valued and responsible member of the organization. Such recognition often acts as a motivator, driving employees to perform their roles with greater diligence and a sense of accountability. This finding suggests that organizations should consciously foster a

culture of respect and recognition at all levels. Simple, cost-effective measures like acknowledging employees' contributions and maintaining respectful workplace interactions can significantly enhance employee morale and their perception of responsibility

"I was the first Sri Lankan female to hold the position of District Director, and I am still the only district director who has looked after clubs throughout Sri Lanka. That experience had a tremendous impact on my leadership journey." (Participant #A).

The first Participant's achievement as the first Sri Lankan female District Director represents a pivotal moment in leadership representation and gender diversity. This statement underscores both the personal significance of the accomplishment and its broader implications for organizational and societal change. Being the first in such a significant leadership role highlights the challenges and opportunities associated with breaking gender norms in traditionally male-dominated spaces. The achievement demonstrates how representation at the highest levels can serve as an inspiration for underrepresented groups, particularly women, to challenge barriers and pursue leadership opportunities.

These instances reflect how women engineers, even in entry-level roles, acted as catalysts for organizational change (McPherson, 2024).

4.2.4 Mentorship and Support

The presence of mentors has played a key role in the formation of the careers of participants. Senior engineers, professors and supervisors provide guidance to participants and enable them to navigate complex professional landscapes. For example, one participant credited her professor for recommending an interview with her, and her first job resulted.

"I started working in the District Engineer's office. There was a wonderful senior engineer, Mr. Daya, who was extremely nice. That is where I began my career, and it was my first job." (Participant #D).

Individuals' career beginnings are often the basis for their professional growth and the tone for their future careers. This statement highlights not only the importance of supportive working environments but also the important role of mentorship in early career development. The positive influence of senior engineer Daya is a strong example of how mentoring can shape the experiences and attitudes of young professionals. Supportive and approachable mentors can provide not only technical guidance but also emotional encouragement. Researching the characteristics of successful mentors and their impact on the satisfaction and advancement of mentors could provide valuable insights for organizations aiming to create an effective mentor culture.

"He always guided and supported me. He has been a mentor throughout my life." (Participant #B)

Mentorship is essential for effective professional growth. A mentor provides not only technical and practical guidance but also emotional and psychological support, particularly during challenging or transitional periods. The participant's description of their mentor as someone who "always guides and supports" highlights the consistency and reliability of this relationship, which is crucial for building trust and fostering confidence in the mentee.

"I remember that I got this advice from a gentleman who was a General Manager. I want to share it. It brought up something different in me. That place was very powerful. He said, 'They will try to put you in a flower pot and keep you in a room. Don't let that happen to you.' No one had given that advice. It gave me a huge impact." (Participant #H).

The eighth participant reflected on a transformative piece of advice from a senior leader, the General Manager, which had a profound impact on her perspective. She recalled being warned against confinement within limiting structures, metaphorically described as a "flower pot" and a "room," which could restrict both personal and professional growth. This unique advice, unlike anything she had received before, reshaped her outlook and reinforced the importance of self-determination. She emphasized how this guidance not only influenced her mindset but also demonstrated the power of mentorship in unlocking potential and fostering resilience. This reflection highlights how strong mentorship can empower individuals to navigate challenges, break barriers, and take control of their own growth. Mentorship not only supported their technical growth

but also provided a network of encouragement and advocacy (Teague, 2000).

4.3 Broader Implications

The narrative reveals the complex interaction of challenges and opportunities in female engineers' first job experiences. Although systemic barriers such as gender discrimination and resource constraints persist, these statistics also highlight the transformational power of resilience, leadership and mentoring (Bergquist and Lsabella, 2024) .

The findings indicate that a supportive environment can be significantly improved by providing policy-based gender equality, mentoring programs and resource allocation programs. These insights are essential to promote inclusion and ensure that women's engineering contributions are fully recognized and appreciated (McPherson, 2024). To improve early career support systems and enhance the professional success of female engineers in Sri Lanka, several recommendations can be made.

First, organizations should establish mentorship programs that connect female engineers with experienced professionals, offering guidance and career development opportunities. Additionally, creating a supportive work environment that promotes gender equality through policies addressing discrimination and bias is crucial. Implementing training programs focused on leadership, technical skills, and personal development can help female engineers build confidence and prepare for higher roles. Furthermore, fostering a culture of work-life balance and providing flexible work arrangements can contribute to long-term career sustainability. Finally, building a strong network of female engineers and encouraging active participation in industry associations can help create a sense of community and professional growth. These initiatives can significantly contribute to the advancement of female engineers in Sri Lanka by equipping them with the resources and support they need to succeed.

Figure 1 shows the visual representation of the themes.

5. CONCLUSIONS

The early career experiences of female engineers in Sri Lanka shed light on the challenges and opportunities women face in male-dominated professions. Their resilience, adaptability, and innovation are evident as they overcome barriers such as discrimination, societal biases, and resource constraints. Mentorship plays a critical role, providing both technical guidance and a support system that helps women navigate complex professional environments. The participants' ability to take on leadership roles and implement systemic improvements highlights their determination and significant contributions to the engineering field.

The study underscores the need for gender sensitive workplace policies, mentorship programs and equitable resource allocation to create inclusive environments where women can thrive. On a societal level, promoting STEM education for young women and challenging traditional gender norms is essential to building a strong pipeline of female leaders in engineering. These insights call for institutional and societal reforms to unlock the untapped potential of women engineers and move toward true gender equity, fostering a diverse and dynamic workforce that drives innovation and progress.

Promoting work life balance through flexible policies and encouraging participation in professional networks can further support career growth. These initiatives collectively equip female engineers with the resources and opportunities needed for long-term success.

This eye-opening research forms part of an extensive ongoing study on the professional trajectories of successful women engineers in Sri Lanka. However, it is not without limitations. The findings are based on insights gathered from only thirteen senior women engineers in the country, which restricts the scope and generalizability of the conclusions. Future studies could benefit from including a larger and more diverse sample to enhance the reliability and robustness of the results. Additionally, this study reflects the early career experiences of a small group of senior women engineers from several years ago in the Sri Lankan industrial sector. To capture the early career

experiences of contemporary women engineers in the current socio-industrial context, a similar study focusing on young women engineers in Sri Lanka is essential. Comparative analyses between such studies could offer valuable insights into whether significant progress has been made over time in the Sri Lankan industrial sector, contributing to the advancement and empowerment of women engineers.

Beyond the Sri Lankan context, future research can examine the transferability of the grounded framework across other South Asian and emerging economies. Applying the framework in different socio- cultural and institutional settings will help assess its robustness and reveal how context shapes women engineers' early career trajectories. Comparative cross-country studies, in particular, can highlight both shared regional barriers and distinctive structural dynamics, thereby offering broader theoretical and practical insights for gender, leadership, and workforce development scholarship.

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