



## MOTIVATIONS TO CHOOSE ENGINEERING; PERSPECTIVES OF YOUNG WOMEN ENGINEERS IN SRI LANKA

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### ABSTRACT

*From its inception to today, engineering has been a profession in which male engineers dominate. Although technology and education have developed to a higher level, there can still be seen a hesitation among young female students to choose engineering as their future career. The masculine nature of the engineering profession is further reinforced with the belief that engineering is not meant for women but men. Numerous factors like balancing work-life conflicts, existing discriminatory practices on women engineers, lack of role models, and the demanding nature of the engineering profession have demotivated young female students to choose engineering and young female engineers to sustain in the engineering profession. Still, the literature is not saturated with studies on women engineers who could sustain in the gendered industries in various contexts. Hence, this study aims to investigate the perception of the self-confidence of young women engineers in the Sri Lankan context and to recommend staying strategies for future women engineers based on their industrial experience, which will motivate young female students to choose engineering. A self-administered questionnaire comprised of several close-ended questions with five-point Likert-type responses and an open-ended question was designed to achieve this study's objectives. It was circulated among a conveniently selected sample of 250 young women engineers in Sri Lanka via email & Facebook. 82 responses were received. Responses for Likert-type questionnaires were analyzed using a simple graphical method, while open-ended responses were analyzed using the thematic analysis technique. Analysis revealed that most respondents were confident in discharging their duties as women engineers. Further, they recommended that future women who wish to become engineers should choose the engineering discipline wisely, be passionate, and be dedicated to the engineering profession if they want to sustain themselves in it. The findings of this study will motivate and guide future young women engineers to succeed in the profession.*

**KEYWORDS:** *Motivation, Profession, Sri Lanka, Women Engineers*

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## **1. INTRODUCTION**

Engineering is a unique profession in today's world that uplifts the general public's lives. People heavily rely on engineering products and processes developed, run, and maintained by engineers. However, since its inception, engineering has been a profession dominated by men (Ramachandran, Ramanathan and Khabou, 2020). Considerably fewer female enrolments can be observed in engineering degree programmes worldwide (Rincon, Korn and Williams, 2019). Furthermore, sustaining percentage of women engineers in various engineering disciplines is also considerably less due to numerous socio-cultural and professional issues in engineering workplaces (Ayre, Mills and Gill, 2013). Although different precautionary measures have been taken to increase the number of women engineers worldwide, they still count for the minority gender-wise. This observation is valid for the Sri Lankan context (Menezes, 2018). Various societal misconceptions demotivate young female students from choosing engineering as their future career (Meiksins *et al.*, 2019). Such misconceptions should be disproven with the support of the experiences of women engineers who are working successfully in the industry to encourage the young female generation to take up the challenge in engineering. This study aims to investigate the self-confidence of young women engineers in the Sri Lankan context and recommend staying strategies for future women engineers. This study's findings can be considered catalysts to encourage young female students to choose engineering as their future career and to remain in the engineering field confidently and competently with men.

## **2. LITERATURE REVIEW**

Women are underrepresented in Science, Technology, Engineering & Mathematics (STEM) fields worldwide, creating a gender disparity (Nimmesgern, 2016; Meiksins *et al.*, 2019). Still, women could not occupy a considerable percentage in the engineering profession worldwide, as well as in Sri Lanka. According to the statistics of the Institution of Engineers Sri Lanka (IESL), which is the apex body for professional engineers in Sri Lanka, women engineers count for 17.6% out of the

total membership, which is still a considerably lower value. In other countries also, the situation is like that. A developed country like the United Kingdom also had only 14.5% women engineers in 2021 (*Gender disparity in engineering - EngineeringUK | Inspiring tomorrow's engineers.*, 2021). Furthermore, a severe gender imbalance exists in several engineering disciplines like construction, heavy industries, and the worldwide power sector (Watts, 2009; *Pathways to Power; South Asia Region Baseline Assessment for Women Engineers in the Power Sector*, 2018). In the Sri Lankan construction industry, women engineers' representation is less than 10% (Menezes, 2018).

Engineering is a challenging and demanding profession where a higher mathematics and scientific knowledge is required with better cognitive skills to solve complex problems (Chan and Fishbein, 2009). Hence, some adults in society motivate young female students not to choose engineering as their future career due to the complex nature of the profession, emphasizing that only men can do it (Wahid, 2020). Moreover, lack of understanding and less interest in the engineering profession among young female students has also reduced their enrollment for engineering degree programmes (*Gender disparity in engineering - EngineeringUK | Inspiring tomorrow's engineers.*, 2021).

After finishing the university education, women engineers confront difficulties in finding suitable engineering job opportunities since some employers hesitate to recruit women engineers to challenging and demanding positions in their companies (Subri, 2018). Some employers have concerns about women's commitment towards their families as a mother and as a caregiver will affect the duties of the engineering job role if they are recruited for such positions. Compared to men, women require maternity leave and additional leave for babysitting and other family commitments (Maji, 2019). Hence, women engineers find it challenging to fulfil their professional responsibilities over the family commitments creating issues in work-life balance.

Most engineering job roles carry a huge workload that requires additional working time to complete

over the traditional work hours. In such situations, women engineers also confront work-life balancing issues (Maji, 2019). Generally, why women engineers leave engineering is a widely discussed topic in the research arena (Fouad *et al.*, 2017; Singh *et al.*, 2018). A study conducted to identify the reasons behind women engineers' decisions to leave the engineering profession in the United States of America (USA) based on a sample of 1461 women engineers who have left the profession has identified three primary reasons (Fouad *et al.*, 2017). The first reason is the poor and/or inequitable compensation, poor working conditions, an inflexible and demanding work environment that made work-family balance difficult for women engineers. The second reason is the unmet achievement needs that reflected unhappiness with the effective application of their engineering knowledge gained from the universities. The third reason is the unmet needs concerning lack of recognition at work and inadequate opportunities for career advancement in the engineering profession. Furthermore, Subri (2018) has identified 14 factors that challenge women engineers' staying in the engineering profession after marriage from a comparative study conducted on previous studies of women engineers worldwide. Those 14 factors were leadership, gender discrimination, sexual harassment, work-life balance conflict (working-family), child care, safety, support, health, work environment, communication, salary, transportation, leave, and women mentors. Of them, gender discrimination, work-life balance conflicts, and child care were the key factors that strongly influenced married women engineers to leave engineering jobs. Faulkner (2009) has highlighted that the engineering workplace culture is still not friendly for women engineers to remain and progress in the profession. Engineering workplace culture should be modified to be a welcoming, comfortable, and supportive place for women engineers. According to Devi, Golden and Regi (2020), women engineers in the Indian construction industries face harassment, discrimination, limited networking opportunities, and long & inflexible working hours. All these factors cause tremendous mental stress for women engineers while catalyzing the decision of leaving the

engineering profession early. Similarly, a qualitative study conducted on a sample of women engineers working in the infrastructure development sector in Sri Lanka about their everyday experiences has identified three major groups of categories as "Everyday life as a struggle, Everyday life as a truce, and Everyday life as persistence" since women engineers' working day comprises with various challenges (Menezes, 2018).

Although numerous studies have identified that women engineers have to face more issues and challenges in the engineering workplace than male engineers do, it does not mean that engineering is not for women (Smith and Dengiz, 2010). According to Devi, Golden and Regi (2020), women are more multi-tasked than men, are professionally ethical, committed to their work, less corrupt, with better listening and soft skills. Furthermore, women are loyal, practical, innovative, and patient and know how to improve the company's reputation. If women engineers are experts in technical matters, with the above qualities they can perform better in the engineering profession than men.

According to the literature, the studies conducted on various aspects of women engineers who stay and sustain themselves in the engineering profession are in the infant stage (Ayre, Mills and Gill, 2013; Buse, Bilimoria and Perelli, 2013). Today, successful and world-famous women engineers have won the world with their passion-driven commitment and persistence while shattering the glass ceiling. The American Society of Mechanical Engineers (ASME) web page displays an article about 10 influential women in engineering who serve in the top management positions in world-leading tech organizations, becoming role models of women engineers. According to the website, their passion for engineering has been the primary reason behind their success (Sethi, 2020). Buse, Bilimoria and Perelli (2013) have identified that women engineers who retained themselves in the engineering profession are persistent. They can overcome countless difficulties in male-dominated industries, enabling them to find fulfilling and rewarding experiences in the engineering profession. Such women engineers

demonstrate high levels of self-efficacy and are motivated by the profession's challenges and novelty. According to Ayre, Mills and Gill (2013), women who stay in the engineering profession firmly believe in themselves as engineers and are self-confident. However, they too had to experience being isolated, overlooked and marginalized in the prevailing masculine culture of engineering workplaces. Thanks to their persistence, such women engineers could successfully retain themselves in the industry for a long time.

Many pieces of evidence can be found in both local and international research literature regarding the challenges and issues faced by women engineers in their job role while focusing on reasons to leave the profession (Watts, 2009; Fouad *et al.*, 2017; Menezes, 2018; Devi, Golden and Regi, 2020). However, studies conducted to identify the reasons and motivations behind women engineers staying in the engineering profession are limited, creating a grey area in the literature (Ayre, Mills and Gill, 2013; Buse, Bilimoria and Perelli, 2013). Such studies are rare in the Sri Lankan engineering sector. Hence, this study aims to fill the existing gap to some extent by investigating the self-confidence of young women engineers in the Sri Lankan industrial sector, which causes their retention in the profession.

### 3. METHODOLOGY

This study used both quantitative and qualitative approaches to achieve the objectives by sharing a self-administered online questionnaire among the target participants. The questionnaire consisted of three sections. The first section consisted of questions to capture the participants' demographic information. The second section consisted of several statements with five-point Likert-type responses to capture participants' perceptions of their self-confidence. The third section consisted of an open-ended question, for which the participants could express their advice and recommendations for future women engineers freely as a qualitative survey. Google form was created, including the questionnaire and a brief description of the research study to share with the participants. It

was shared among a conveniently selected sample of 250 young women engineers in Sri Lanka via email and Facebook within 2021. Nowadays, various scholars widely use convenient sampling because it is convenient in reaching the research participants for data collection (Jager, Putnick and Bornstein, 2017).

Simple data analysis strategies were followed to analyze the responses since authors wish to disseminate the findings, especially among women engineering undergraduates and young school girls, to popularize engineering as a career choice for them. Responses received for Likert-type statements were analyzed using simple bar charts for the convenience of understanding (Robbins and Heiberger, 2011). Responses to the open-ended question were analyzed following the thematic analysis approach to identify the emerging patterns and themes relevant to the positive workplace experiences of young women engineers in Sri Lanka (Braun and Clarke, 2006).

### 4. RESULTS & DISCUSSION

For the questionnaire, eighty-two responses could be collected from young women engineers in Sri Lanka. Hence, the response rate is 32.8%. Young women engineers who responded to this questionnaire will be known as 'respondents' hereafter in this paper.

#### Demographic information of respondents

In this section, the demographic information of the respondents is demonstrated.

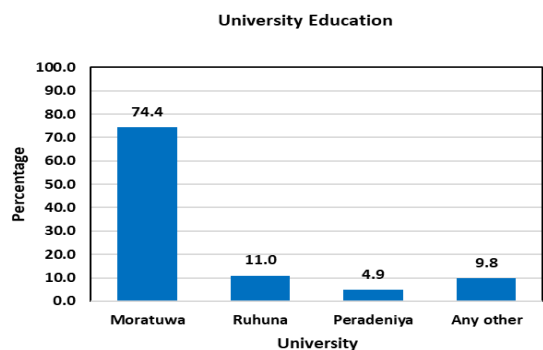


Figure 1: University wise education of respondents

Most respondents have studied at the University of Moratuwa (74.4%). All respondents were below the age of 35 years at the time of this study.

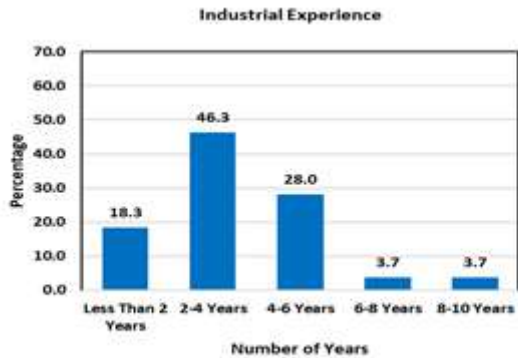


Figure 2: Industrial experience of respondents

According to figure 2, the industrial experience of respondents was below 10 years. The majority of the respondents have the industrial experiences for 2 – 4 years (46.3%).

Young women engineers from various engineering disciplines have responded to the questionnaire. Table 1 shows the percentage of respondents who answered from each engineering discipline.

Table 1: Engineering discipline wise distribution of respondents

Engineering Discipline	Percentage
Chemical & Materials Engineering	28.0
Civil Engineering	24.4
Electrical & Electronics Engineering	24.4
Mechanical & Production Engineering	6.1
Computer Engineering	2.4
Any Other	14.6
<b>Total</b>	<b>100.0</b>

Furthermore, 63.4% of respondents work in the private sector organizations as engineers, while 36.6% of respondents work in the state sector organizations as engineers. 12.2% of respondents are the only female engineers who work in their workplaces, while 87.8% have other female engineers in the workplace.

### The self-confidence of young women engineers

Several statements were given to respondents to

investigate their perception on self-confidence as young women engineers in Sri Lankan industrial sector. Their responses on a five-point Likert scale were illustrated as bar charts for easy readers' understanding.

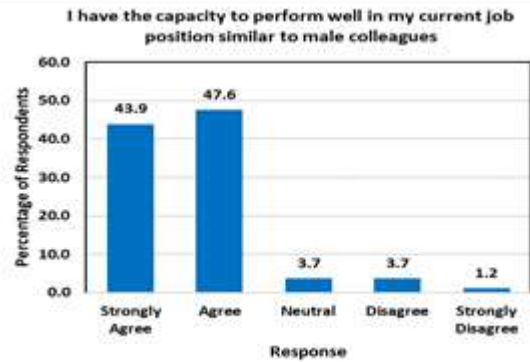


Figure 3: Perception on capacity to work in current job position

Figure 3 illustrates respondents' perception on their capacity to perform well in the current job position in comparison with the male colleagues. Majority of them (91.5%) have the confidence to perform competently in their current engineering job positions. Society has a belief that women engineers do not have the required capacity to fulfill engineering job related responsibilities (Ramachandran, Ramanathan and Khabou, 2020). The above finding disproves the misconception prevailing in the Sri Lankan society to some extent.

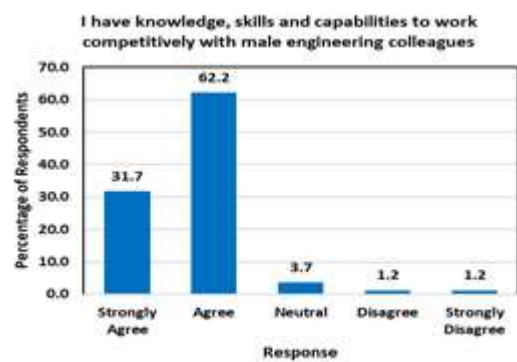
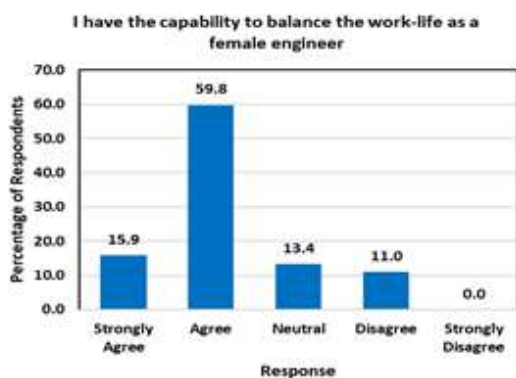


Figure 4: Perception on ability to work competitively with male engineering colleagues

Since male engineering colleagues represent the majority of the engineering profession, the minority

of women engineers have to work competitively with them if they expect to sustain themselves in the profession. If women engineers do not have the required persistence, they will automatically opt-out of the profession without competition (Buse, Bilimoria and Perelli, 2013). According to figure 4, most respondents (93.9%) have verified that, as per their experience, they have knowledge, skills, and capabilities to work competitively with male engineering colleagues. Only a few respondents were not confident of performing competitively with male engineering colleagues.

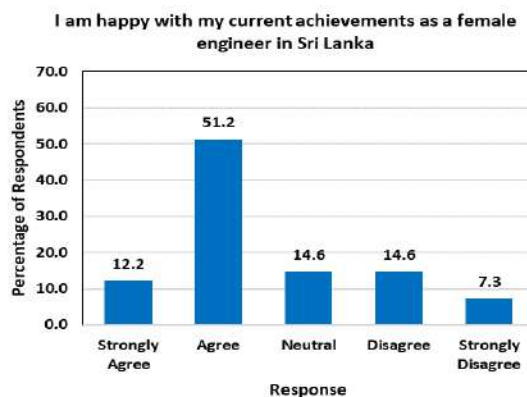


**Figure 5: Perception on ability to balance the work-life**

Most of the available literature highlights that women engineers confront issues in balancing the work-life with their job-related responsibilities (Watts, 2009; Menezes, 2018). However, 75.7% of respondents believe that they can balance their work-life as female engineers. Only 11.0% of respondents have disagreed with it, while 13.4% of respondents have stayed in a neutral attitude. This observation can be considered a positive trend happening among the young female engineers' community to balance their work-life. As Sethi (2020) emphasized, if they have the passion and commitment for the engineering profession, work-life balancing is not a very difficult or complex thing to achieve.

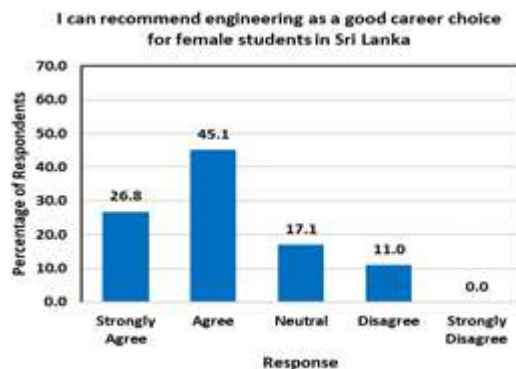
According to figure 6, 63.3% of respondents are happy about their achievements as female engineers, while 21.9% of respondents are unhappy about their accomplishments. However, more than half of the respondents have emphasized that they are satisfied with their current achievements demonstrating that

Sri Lankan industrial sector is not an unsuitable place for women engineers.



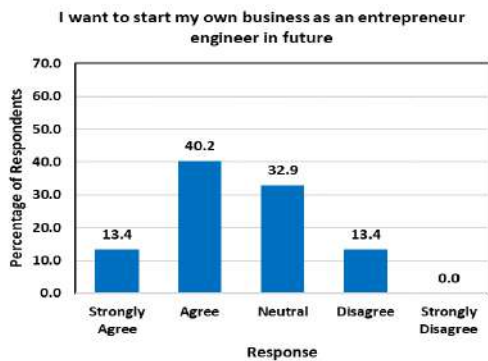
**Figure 6: Perception on current achievements as a female engineer**

As Menezes (2018) highlighted, most Sri Lankan women engineers have the required dedication and courage to achieve what they need in their professional life while overcoming day-to-day struggles and barriers.



**Figure 7: Perception on recommending engineering**

Based on the industrial experience and current achievements, 71.9% of respondents have verified that they can recommend engineering as a good career choice for female students in Sri Lanka. 11.0% of respondents have disagreed with it while 17.1% have stayed neutral. However, the majority is recommending young female students to choose engineering as their future career since engineering is a promising profession not only for men, but also for women in Sri Lanka.



**Figure 8: Perception to be a women entrepreneurial engineer**

Nowadays, entrepreneurship has become a promising wealth creation by establishing innovative firms. Figure 8 demonstrates the perception of respondents on establishing their own business ventures as women entrepreneurial engineers in Sri Lanka. It was observed that women entrepreneurial engineers are scarce in the Sri Lankan context (Wijesinghe, Jayawardane and Dasanayake, 2021). According to figure 8, a considerable number of respondents are willing to start up their own firms as entrepreneurs in Sri Lanka (53.6%), while 32.9% of respondents have stayed neutral on this statement. All engineers cannot become entrepreneurial engineers due to various reasons. However, this is an excellent evidence to show the entrepreneurial intention of young women engineers in Sri Lanka. Women entrepreneurial engineers need the support of the government and international organizations to empower them as successful female entrepreneurs in engineering disciplines (Mehrzaad *et al.*, 2021).

These findings show that most respondents are self-confident to compete with male engineering colleagues while fulfilling the engineering-related job responsibilities competently in the Sri Lankan industrial sector. The majority of them are satisfied with their current achievements as female engineers, while they also recommend the engineering profession for young females.

## Recommendations for future women engineers

Thematic analysis of the responses received for the open-ended question in the questionnaire as advice & recommendations for future women engineers reveals three themes of advice. They are ‘choose the field wisely, be passionate, and be dedicated to the profession.’

- **Choose the field (engineering discipline) wisely**

Since there are several engineering disciplines nowadays for any engineering undergraduate to be specialized, selection should be made wisely as it affects the entire professional life of the engineer irrespective of gender. Several respondents have mentioned that young female engineering undergraduates should be extra careful in selecting their engineering disciplines. A respondent has mentioned her advice as “*Get a thorough awareness about all the engineering disciplines before choosing your field.*” According to her, selecting the discipline without a background check will be disastrous for any female engineer as such selections will not suit their professional expectations. “*Better to study in a field you are interested in; if not, work-life will be stressful.*” Another response is as above. Studying in an uninterested field is stressful during undergraduate education for any student. Similarly, performing job-related responsibilities in an uninterested engineering discipline will give women engineers the same stressful experience, causing them to leave the engineering profession in a shorter time. Two other respondents also emphasize “*Select your favourite field*” and “*Choose what you prefer.*” Choosing the preferred field is sometimes difficult in engineering degree programmes offered by state-sector universities in Sri Lanka. It is based on the merit list prepared based on the marks for semester-end examinations of the first year of the degree programs. If anybody wants to choose the preferred engineering discipline, they should work hard and score higher marks in the examinations above.

- **Be passionate about engineering**

Choosing engineering just because you are an expert

in Mathematics is not a reason to become a successful engineer irrespective of gender (Fouad *et al.*, 2017). As Devi, Golden and Regi (2020) highlighted, men typically have engineering-related hobbies like assembling and disassembling complex toys during their childhood. However, young girls have soft hobbies like playing with dolls that do not have any association with engineering. Hence, females are less passionate about engineering subjects from childhood. Several respondents have emphasized that young women engineers should be passionate about engineering. *“Do not select engineering if you are not truly passionate about the field and new technologies.”* As the above advice highlights, women engineers should also have a keen eye for new technologies. They should get updated with the latest technologies relevant to their practice area.

*“Being a girl is not an obstacle to being an engineer. If you are interested and have good analytical skills, you can perform well in an engineering profession.”* According to Ramachandran, Ramanathan and Khabou (2020), women engineers coming out from Indian Universities are confident to work competitively with male engineers in rapidly growing industrial sectors in India since such women are interested in engineering like males. Sri Lankan young women engineers have identified the same from their experience in the industry.

Another respondent has verbalized her advice as *“Do not consider the gender as a disadvantage. It's not the gender that matters, it is the knowledge, and the passion always matters.”* This, too, highlights the significance of self-induced passion for engineering for the success of women engineers in Sri Lanka. As per her experience, gender disparity is nullified if the female engineer has sufficient knowledge and passion for the engineering profession. According to Hersh (2000), there is a higher tendency for women engineering graduates who do not have the passion for engineering to leave the engineering profession within a short period of employment to non-engineering positions in various other organizations. Hence, women engineers, especially the young generation, should have the passion and interest in

engineering to sustain the industry successfully.

- **Be dedicated to the profession**

The majority of the respondents have mentioned that young women engineers should be more dedicated to the profession in various ways if they want to sustain themselves in the engineering profession. As Ayre, Mills and Gill (2013) highlighted, persistence is required for women engineers to be in the profession amidst various conflicts. If dedication is not there, they cannot be persistent. To work competently in the engineering profession, women engineers should dedicate themselves to their job, although it is not easy. A respondent has verbalized her concern as *“Work hard until you reach your destination and of course, at the starting stage of the engineering profession, as a fresh graduate or without field experience may lead to some stress full career in your life. But after two or three years, it will change. If you work hard in your career, definitely you will become a successful engineer in society. So don't give up.”* According to her, becoming a successful women engineer is not that easy. There may be a lot of ups and downs due to various reasons like lack of industrial experience and knowledge. If the female engineers have the endurance to face the challenges while working hard, two-three years are enough to grab the essence to sustain in the industry. As Chan and Fishbein (2009) highlighted, gaining industrial experience is very important for any young engineer to sustain in the industry. *“Need to be thorough on basic engineering principles and important to have hands-on experience on the field you are in.”* The above excerpt also proves that women engineers should be thorough in engineering knowledge and have hands-on experiences in engineering activities relevant to the field of practice. Hence, it is not required to be afraid of making firm decisions in a professional capacity if she is confident about her knowledge and experience. *“Due to lack of knowledge and experience, many young women engineers cannot make firm decisions in their jobs. Because of that, they have to seek the support of male engineering colleagues, which in turn support the claim that female engineers are incompetent (Subri, 2018)”*



A respondent has expressed her advice as, “*I am telling you this advice from my personal experience. If you are interested in the engineering profession, ignore all negative thoughts and comments from others.*” Still, society is full of negative thoughts and instructions which could demotivate any young female student from choosing engineering as her future career choice (Ramachandran, Ramanathan, and Khabou, 2020). According to the above excerpt, if any young female student is interested in engineering, she may not consider the negative thoughts and comments of others, which discourage them since engineering is a promising profession for women worldwide (Sethi, 2020). Another respondent has articulated her advice to the young generation as “*Choose engineering as the profession if you are really ready to accept challenges as a female engineer.*” Female engineers indeed have to face more challenges than male engineering colleagues in any society (Watts, 2009). However, sustaining them in the engineering profession is not difficult if they are dedicated to meeting those challenges.

“*Must develop their communication skills, personality, & leadership skills, etc.*” Engineers should have a balanced set of technical and soft skills for better performance (Chan and Fishbein, 2009). Hence, irrespective of gender, engineers should develop soft skills like communication, personality, and leadership skills. Since women engineers have to undergo various difficulties in the field, they should have the above skills to face the challenges successfully. Furthermore, another respondent has stated that they should “*respect to all workers and technicians.*” Women engineers should also focus on this matter since they have to maintain a healthy relationship with subordinate employees where the majority are males. It is essential for long-term existence in the profession.

Work-life balancing is another issue confronted by a majority of women engineers in the world (Watts, 2009; Singh *et al.*, 2018). Hence, another respondent has mentioned it in her advice: “*Personal & professional life balance is the main challenge faced by lady engineers. All must be more concerned about it.*” To tackle this problem, the support of senior women engineers is essential for young women

engineers as mentors. They can guide the young generation on balancing personal and professional life. However, the lack of female role models in the engineering field is widespread in most countries globally (Devi, Golden, and Regi, 2020). In such situations, professional engineering associations should take the lead to share the experiences of successful senior women engineers with young women engineers to fill this gap.

From the above findings, it is clear that young women engineers should focus on selecting the preferred or interested engineering discipline to perform successfully in that discipline. Furthermore, they should be passionate and dedicated to the engineering profession if they really need to sustain themselves as women engineers in Sri Lanka.

## 5. CONCLUSIONS

Based on this study, it can be concluded that the majority of the young women engineers who participated in this study are confident about themselves as women engineers. As per their responses, they have the capacity, knowledge, skills, and capabilities to work competently in the industry with men. The majority of them are satisfied with their current achievements and have recommended engineering as a promising career choice for young female students in Sri Lanka. As advice, they instruct future young women engineers in Sri Lanka to choose the field wisely, be passionate, and be dedicated to the engineering profession if they want to retain themselves in it. The findings of this study can be considered as recommendations for future women engineers to consider as stay strategies in the engineering profession.

This research, too, has several limitations. Choosing the convenient sampling strategy limits the generalizability of this study's findings to the entire young women engineer population. Depending only on the data collected from young women engineers can be identified as another significant limitation of this study. Hence, further studies should be conducted with senior women engineers, engineering employers and male engineering colleagues in Sri

Lanka to expand the research literature associated with the minority group of women engineers in Sri Lanka.

## 6. REFERENCES

- Ayre, M., Mills, J. and Gill, J. (2013) “‘Yes, I do belong’: the women who stay in engineering”, *Engineering Studies*, 5(3), pp. 216–232. doi: 10.1080/19378629.2013.855781.
- Braun, V. and Clarke, V. (2006) ‘Using Thematic Analysis in Psychology’, *Qualitative Research in Psychology*, 3(2), pp. 77–101. doi: <http://dx.doi.org/10.1191/1478088706qp0630a>.
- Buse, K., Bilimoria, D. and Perelli, S. (2013) ‘Why they stay: Women persisting in US engineering careers’, *Career Development International*, 18(2), pp. 139–154. doi: 10.1108/CDI-11-2012-0108.
- Chan, A. and Fishbein, J. (2009) ‘A global engineer for the global community’, *The Journal of Policy Engagement*, 1(2), pp. 4–9. Available at: [http://members.peo.on.ca/index.cfm/document/1/ci\\_id/36731/la\\_id/1](http://members.peo.on.ca/index.cfm/document/1/ci_id/36731/la_id/1).
- Devi, B. D., Golden, S. A. R. and Regi, S. B. (2020) ‘Challenges Faced By Women Engineering Graduates In Construction Industry’, *International Journal of Disaster Recovery and Business Continuity*, 11(1), pp. 3182–3190.
- Faulkner, W. (2009) ‘Doing gender in engineering workplace cultures. I. Observations from the field’, *Engineering Studies*, 1(1), pp. 3–18. doi: 10.1080/19378620902721322.
- Fouad, N. A. *et al.* (2017) ‘Women’s Reasons for Leaving the Engineering Field’, *Frontiers in Psychology*, 8(JUN), pp. 1–11. doi: 10.3389/fpsyg.2017.00875.
- Gender disparity in engineering - EngineeringUK / Inspiring tomorrow’s engineers.* (2021). Available at: <https://www.engineeringuk.com/research/briefings/gender-disparity-in-engineering/> (Accessed: 15 November 2021).
- Hersh, M. (2000) ‘The changing position of women in engineering worldwide’, *IEEE Transactions on Engineering Management*, 47(3), pp. 345–359. doi: 10.1109/17.865903.
- Jager, J., Putnick, D. L. and Bornstein, M. H. (2017) ‘More Than Just Convenient: the Scientific Merits of Homogeneous Convenience Samples’, *Monographs of the Society for Research in Child Development*, 82(2), pp. 13–30. doi: 10.1111/mono.12296.
- Maji, S. (2019) “‘Doing Men’s Jobs’: A Commentary on Work–Life Balance Issues Among Women in Engineering and Technology”, *Metamorphosis: A Journal of Management Research*, 18(1), pp. 68–75. doi: 10.1177/0972622519854887.
- Mehrzad, M. *et al.* (2021) ‘Female Afghan engineers’ perceptions of chokepoints along the career trajectory to entrepreneurship’, *Journal of Entrepreneurship in Emerging Economies*. doi: 10.1108/JEEE-11-2020-0410.
- Meiksins, P. *et al.* (2019) ‘Women in Engineering: A Review of the 2018 Literature’, *SWE Magazine*. Available at: <https://altogether.swe.org/2019/04/women-in-engineering-a-review-of-the-2018-literature/> (Accessed: 5 November 2021).
- Menezes, D. (2018) ‘Of Struggles, Truces and Persistence; Everyday Experiences of Women Engineers in Sri Lanka’, *Journal of International Women’s Studies*, 19(2), pp. 123–139. Available at: <http://vc.bridgew.edu/jiws/vol19/iss2/8>.
- Nimmegern, H. (2016) ‘Why Are Women Underrepresented in STEM Fields?’, *CHEMISTRY-A European Journal*, 22, pp. 3529–3530. doi: 10.1002/chem.201600035.
- Pathways to Power; South Asia Region Baseline Assessment for Women Engineers in the Power Sector* (2018). Available at: <http://www.springer.com/series/5972>.

- Ramachandran, B., Ramanathan, C. and Khabou, M. (2020) 'Advancement of Women in Engineering: Past, Present and Future', in *American Society for Engineering Education*. doi: 10.2139/ssrn.3683980.
- Rincon, R., Korn, R. M. and Williams, J. C. (2019) 'Examining gender bias in engineering in India', in *ASCE Annual Conference and Exposition*. Florida. doi: 10.18260/1-2--32777.
- Robbins, N. B. and Heiberger, R. M. (2011) 'Plotting Likert and Other Rating Scales', *Joint Statistical Meetings*, pp. 1058–1066. Available at: [http://www.amstat.org/sections/srms/proceedings/y2011/Files/300784\\_64164.pdf](http://www.amstat.org/sections/srms/proceedings/y2011/Files/300784_64164.pdf).
- Sethi, C. (2020) *10 Influential Women in Engineering - ASME*. Available at: <https://www.asme.org/topics-resources/content/10-influential-women-in-engineering> (Accessed: 23 January 2022).
- Singh, R. *et al.* (2018) 'Why do women engineers leave the engineering profession? The roles of work–family conflict, occupational commitment, and perceived organizational support', *Human Resource Management*, 57(4), pp. 901–914. doi: 10.1002/hrm.21900.
- Smith, A. E. and Dengiz, B. (2010) 'Women in engineering in Turkey - a large scale quantitative and qualitative examination', *European Journal of Engineering Education*, 35(1), pp. 45–57. doi: 10.1080/03043790903406345.
- Subri, U. S. (2018) 'A Review of Job Challenges Factors for Women Engineer', *International Journal of Academic Research in Business and Social Sciences*, 8(9), pp. 1450–1455. doi: 10.6007/ijarbss/v8-i9/4834.
- Wahid, M. (2020) 'Why are women a minority in Engineering?', *Daily News*, 29 January. Available at: <https://www.dailymirror.lk/print/news-features/Why-are-women-a-minority-in-Engineering--/131-182065> (Accessed: 5 November 2021).
- Watts, J. H. (2009) "'Allowed into a Man's World' Meanings of Work-Life Balance: Perspectives of Women Civil Engineers as "Minority" Workers in Construction', *Gender, Work and Organization*, 16(1), pp. 37–57. doi: 10.1111/j.1468-0432.2007.00352.x.
- Wijesinghe, D. P. S., Jayawardane, V. . P. . and Dasanayake, S. W. S. . (2021) 'Ethics into Practice : Holding Paramount Health , Safety & Welfare of the Public by Entrepreneurial Engineers in Sri Lanka', *Engineer: Journal of the Institution of Engineers, Sri Lanka*, 54(03), pp. 87–97. doi: <http://doi.org/10.4038/engineer.v54i3.7462> Ethics.