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WAY TO SUCCESS – PERSPECTIVES OF WOMEN LEADERS IN ENGINEERING

H.A.D. Saumyadi[1], V.P.T. Jayawardane[2]

University of Moratuwa, Sri Lanka

Emails: [1]danusisaumyadi@gmail.com, [2]thesaraj@uom.lk

ABSTRACT

Engineers are key personnel in the industrial sector worldwide. Engineers' contribution to economic development is remarkable in any country by performing their duties in numerous industries and businesses. Unlike other professions, engineering is dominated by male professionals worldwide. Despite the prevailing masculine culture in industries, numerous women engineers have become professionally successful leaders in the workplace. Although there are such women leaders in the Sri Lankan industrial sector, a few studies have been done to investigate their exceptional performance to enhance the knowledge base of professional success. This study aimed to determine the success techniques advocated by women engineers in Sri Lanka. Nearly 250 leading women engineers in Sri Lanka's state and private sectors were given the online qualitative survey. Forty-six replies were received and examined using content analysis with NVivo. Identified success techniques and the percentage of respondents who have mentioned those success techniques were as follows: involving in continuing professional development – 63%, developing soft skills – 57%, working hard – 37%, developing personality – 26%, and following ethics – 26%. This study's findings can be considered guidelines for young women engineering professionals in Sri Lanka to nurture their professional journey to success.

Key words: Leaders, Professional Success, Sri Lanka, Women engineers

1. Introduction

Edith Clarke, who was the first lady to be professionally employed as an electrical engineer in America, once mentioned, *"There is no demand for women engineers, as such, as there are for women doctors; but there's always demand for anyone who can do a good piece of work"*. Although decades of years passed, still engineering profession is dominated by men. Out of the limited number of women engineers employed worldwide, only a few could sustain themselves in the industry as successful leaders in the profession. In such a situation, identifying and disseminating the success techniques employed by women leaders in the Sri Lankan engineering sector is a timely necessity to cherish young women engineers into professionally successful industry leaders.

2. Literature Review

The gender gap in science, technology, engineering, and mathematics (STEM) has persisted throughout the years on a global scale. Engineering continues to have one of the highest attrition rates for women in the STEM fields, with a percentage of forty percent (Ramachandran et al., 2020). In some countries, this percentage is lower than the above (*Pathways to Power; South Asia Region Baseline Assessment for Women Engineers in the Power Sector*, 2018). Equality of opportunity and gender is a human right that needs to become ingrained in the culture so it can be fully realized. Because it is such a significant driver of innovation and economic growth, the scientific community cannot afford to lose talented individuals (Nimmesgern, 2016).

Gender disparity is clearly visible in the construction sectors of various countries. The majority of the current literature describes the challenges that are faced by women who work in this industry. These challenges include cultural and structural barriers, such as harassment and discrimination, limited opportunities for networking, and long and inflexible working hours. These challenges frequently result in poor career prospects and high-stress levels for women (Devi et al., 2020). Continuously confronting such challenges cause women engineers to leave the profession. A study conducted in the United States of America by Fouad et al. (2017) identified three major reasons women engineers leave the profession.

- Poor and/or inequitable compensation, poor working conditions, and an inflexible and demanding work environment made work-family balance difficult.
- Unmet achievement needs reflected dissatisfaction with effectively utilising their math and science skills.
- Unmet needs concerning lack of recognition at work and adequate opportunities for advancement.

Furthermore, the literature contains the studies conducted to identify why women engineers stay in the profession. Buse et al. (2013) indicated that the reasons why women continue to work in engineering are not the reverse of why other studies have identified women leaving the engineering field. These findings show that women in engineering experience difficulties related to the male-dominated aspects of

engineering, but women who persist despite these difficulties can overcome them, which enables them to find fulfilling and rewarding experiences in the engineering profession. Previous research has found that the cultural aspects of an engineering career cause women to leave the profession. However, these findings show that women in engineering experience difficulties related to the male-dominated aspects of engineering. Identifying the staying strategies for women engineers is very important for any context as engineering is a strong contributor to innovation and prosperity and cannot afford to lose any talented individual because of gender (Nimmesgern, 2016). Outcomes of such studies will encourage young women engineers to play their roles competently in the gendered work environment to achieve professional success.

Minimal studies have been conducted in the Sri Lankan context regarding women engineers. According to Menezes (2018), the 'problem' of women in engineering is not just one of recruitment. The everyday lives of women engineers in Sri Lanka can be defined by their work and the cultural practices they participate in. The result is that every day consists of struggles, truces and persistence. Saumyadi & Jayawardane (2022) have identified that young women engineers have the capacity, knowledge, skills, and capabilities to work competently in the industry with their male counterparts. Hence, achieving professional success will not be a big deal for them if they have the correct guidance from the successful women engineering leaders in the country. This study will contribute to that requirement in the Sri Lankan context.

3. Methodology

The success techniques advocated by leading women engineers in Sri Lanka were investigated qualitatively to identify all the possible strategies that were not previously identified. The use of quantitative methods hinders the emergence of previously undisclosed information (Cresswell, 2014). An online questionnaire with an open-ended question and a few other questions to identify the demographics of respondents were administered via email to a conveniently selected sample of two hundred fifty women engineers who had chartered engineer status in Sri Lanka. Convenient sampling is a sampling strategy where participants are chosen based on convenience on their accessibility and/or proximity to the research (Jager et al., 2017; Marshall, 1996). Although the results are not generalisable to the whole population like in probability sampling, scholars widely use it for convenience and to get a feel for the phenomenon (Sekaran & Bougie, 2016, pp 255). Responses for the open-ended question were analysed using the content analysis technique with the support of the NVivo software. Content analysis is an observational research method that is used to systematically evaluate the symbolic contents of all forms of recorded communications (Sekaran & Bougie, 2016, pp.350)

4. Results & Discussion

Forty-six responses were received for the shared questionnaire. From here onwards, women engineers who responded to this study will be known as 'respondents' in this article. The demographic information of the respondents was as follows. 76% & 17% of the respondents work in the state and private sector, respectively. Only 7% of respondents work as entrepreneurs. Industrial experiences of all of them range from ten years to forty years. All the respondents have followed at least a single post-graduate qualification, including certificate courses, diplomas, masters and PhDs. Eleven respondents have followed more than two post-graduate qualifications. The following table demonstrates the major categories of success techniques with the percentages of respondents who have mentioned them in the responses and the sub-categories that contributed to the development of the major categories.

Table 1: Success techniques and their properties

Category	Properties
Involving in Continuing Professional Development (CPD) – 63%	Learning, Becoming an expert, Obtaining professional qualifications
Developing soft skills – 57%	Communication, Teamwork, Leadership, Networking,
Persevering – 37%	Working hard, Dedicating to the profession, Getting work experiences
Developing Personality – 26%	Setting & achieving goals, Professionalism, Confidence, Sensitivity
Following ethics – 24%	Adhering to ethics, being honest

Source: Qualitative Survey Data (2022)

4.1. Involving in CPD

Sixty-three percent of respondents have mentioned that involvement in CPD is essential for achieving professional success. It is widely accepted that professionals like engineers should continue professional development activities throughout their professional life (Ferguson, 1998). Code of ethics for engineers too has highlighted the requirement of CPD as an ethical obligation to the profession (*The Institution of Engineers Sri Lanka - Code of Ethics*, 2013). As per respondents, young women engineers can follow strategies

like learning, doing things to become an expert in the field and obtaining professional qualifications. A respondent mentioned this: "*When you go to the field as a young engineer, do not think you know everything you want. Learning is a never-ending process; we all are still learning until the end. So do not hesitate to learn from every person you meet. They are the university to all of us."* Another respondent has stated: *"Be technically sound in the field in which you work. Technical soundness is a must than anything else"*. As knowledge workers, engineers should update their knowledge continuously with the latest trends in technology (Fasano, 2015). It is a well-known fact that any engineer with outdated knowledge cannot become successful in professional life. Therefore, professional development should happen continuously.

4.2. Developing soft skills

Fifty-seven percent of respondents have stated that developing soft skills is vital for the professional success of women engineers. In the contemporary world, various soft skills are necessary to perform the duties of a successful engineer (Fasano, 2015). Respondents have advised the young generation to develop communication, teamwork, leadership and networking skills to become successful engineering leaders. A respondent has stated: *"Improve your communication and leadership skills, find the great leader within you"*. Another respondent has highlighted that *"developing and improving soft skills including communication, time management, problem-solving, teamwork, presentation, and customer services are very important"*. This comment also needs to be highlighted: *"Develop networks with other professionals and get their expert knowledge where ever necessary"*. There are many incidents in the industry where technically expert engineers fail in their professional life due to a lack of soft skills (Menezes, 2018). Hence, developing soft skills is vital for any young engineering professional.

4.3. Persevering

Most engineering jobs are demanding and require hard work to perform (Fasano, 2015). As per thirty-seven percent of respondents, young engineers, especially women engineers, should work hard, dedicate to the profession and get work experiences as much as possible to succeed. This response highlights it. *"Do work hard and get all experiences by passing the barriers".* Many women engineers leave the profession as they could not face this demanding nature of the profession (Devi et al., 2020). However, successful senior women engineers have identified that perseverance is required to achieve professional success. More studies should be done to investigate how they have been dedicated to the profession amidst many other challenges.

4.4. Developing personality

Twenty-six percent of respondents have recommended that having a good personality is a successful strategy for themselves. Hence, young women engineers should develop their personalities to become successful professionals by setting & achieving goals, demonstrating professionalism and having confidence & sensitivity. A respondent has stated: *"First, identify your strengths and define your goals. Then try smarter to achieve*

them." Many women engineers get demotivated when they face challenges in the engineering profession (Menezes, 2018). Hence, if they perform with degraded personalities, it will not support their professional success. Setting goals and achieving them smartly will boost the personality of the person. Furthermore, another respondent highlighted, *"We should understand that we are working with different professionals. Always try to show our professionalism to others"*. As highlighted, professionalism can also uphold any engineer's personality and recognition in the industry for their success (Fasano, 2015).

4.5. Following ethics

As professionals, engineers shall work according to the applicable code of ethics (Hansen & Zenobia, 2011). Twenty-four percent of respondents have mentioned that following ethics is a successful strategy. By adhering to ethics and being honest, young women engineers should discharge their duties to society if they want to succeed professionally. A respondent has recommended this as *"Always follow Engineering Ethics when performing the work".* Unethical behaviour is not long-lasting in any setting. Although it is booming at the beginning, such behaviours become futile, affecting the doer's reputation at the later stage (Taebi, 2021). In addition, a respondent has recommended being honest as *"Be honest to your profession"*. Honesty gives satisfaction to a successful professional life. Although dishonest people become successful in some situations, their dishonest and unethical behaviours become causes for regret later in life (Radoilska, 2008). Hence, ethics and honesty are vital for professional success.

5. Conclusions & Implications

The study conducted with senior women engineering leaders in Sri Lanka has identified that involvement in continuing professional development, developing soft skills, perseverance, developing personality and following ethics as crucial success strategies to be followed by young women engineers in Sri Lanka to succeed professionally. Hence, young women engineers can follow these strategies in the masculine work setting to sustain themselves in the industry as successful professionals. Although the findings are not generalisable, this study is worth it for any young Sri Lankan engineer to adopt those strategies targeting professional success irrespective of the gender. Future studies should be designed to generate generalisable results by adopting probability sampling strategies for the betterment of the minority group of women in engineering.

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