

Barriers to Professional Success of Engineers in Sri Lanka

D.P.S. Wijesinghe and V.P.T. Jayawardane

Abstract: The professional success of engineers is a key driver of national development in Sri Lanka. Due to the scarcity of systematic academic studies on the professional success of Sri Lankan engineers, this study was conducted to explore the barriers that influence the professional success of Sri Lankan engineers. An online questionnaire was distributed via email to over 4,000 Chartered Engineers in the country, following a convenience sampling approach, as a qualitative survey. The responses were analysed using NVIVO software employing the thematic analysis method. The study has revealed unethical behaviour of stakeholders, lack of practical knowledge & skills, issues of work-life balance, lack of facilities, financial barriers, and regulatory barriers as the barriers influencing the professional success of engineers in Sri Lanka. Since the sample consists only of chartered engineers, this study does not reveal the barriers faced by other groups of engineers in the country. These findings support further investigations on barriers in a more focused manner. Recommendations are made to address these barriers, fostering a more supportive environment for engineers to thrive.

Keywords: Barrier, Career, Engineer, Professional Success, Sri Lanka

1. Introduction

Engineers greatly contribute to the economic development of any country. They further support the achievement of the sustainable development goals of the United Nations. Hence, engineering is an important profession in the world. Similarly to any profession, engineers also expect professional success during their professional journey. In particular, in a developing country like Sri Lanka, the achievement of professional success by engineers can be affected by many factors. This study aims to explore the barriers that influence the professional success of engineers in Sri Lanka. Since such studies are not widely available in the Sri Lankan context [1], this study aims to identify the existing barriers and recommend necessary actions to overcome them, enabling engineers in the country to achieve professional success.

2. Literature Review

The purpose of this review of the literature is to explore the barriers to the professional success of engineers by examining scholarly articles that have studied the challenges faced by engineers in both local and international context. Authors have defined 'Professional Success' [2] as follows. Professional success is the achievement of personal and career goals through skill mastery, career advancement, and meaningful contributions to one's field, while maintaining job satisfaction and work-life balance. It reflects

a combination of personal fulfilment and external recognition.

2.1 Educational constraints

Educational barriers have been identified as the main challenge faced by engineers worldwide to their professional success [3]. Engineering education systems in most countries still use traditional curriculums, which has a lesser emphasis on practical skills and soft skills, such as communication skills and leadership skills required by the modern engineer [4]. This mismatch between the skills of graduate engineers and the skills required by the industry has created a skill gap. Although engineers are technically proficient in handling engineering operations, lack of essential soft skills hinders their professional success [5]. In addition, engineers face difficulties in applying the theories they learnt at university to practical applications in industry [6]. Therefore, most of them fail to apply engineering theories practically at work.

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Today the world is moving forward with the outcome-based education system [3]. Most of the state universities that offer engineering degree programmes in Sri Lanka have adopted the outcome-based education system with the Washington Accord guidelines [7]. According to [8], punctuality, integrity, commitment and tolerance have been identified as the most sought-after employment skills in Sri Lanka. However, this should be further investigated to check whether Sri Lankan engineering graduates have developed them through the current education system.

2.2 Workplace discrimination

Workplace discrimination and gender bias have been identified in the scholarly literature as a major barrier to the professional success of engineers. The engineering profession is a male dominant field and because of that female engineers experience various types of discrimination in the workplace [9]. Women engineers frequently experience discrimination in terms of recruitment, promotion, and professional development opportunities, which finally affects their professional success [10]. Gender-based discrimination still prevails in the Sri Lankan industrial context to some extent [11]. Workplace discrimination does not only happen based on gender. Some cases have been reported in engineering fields worldwide where discrimination is based on the skin colour of the professional, race, or the religion [12].

2.3 Lack of opportunities for professional development

Continuing Professional Development (CPD) or Lifelong Learning (LLL) is an essential aspect for the professional success of engineers working in any country [13]. Although it is essential, engineers cannot participate in such opportunities for various reasons [14]. However, a considerable number of engineers worldwide encounter obstacles to accessing CPD programmes due to financial constraints, lack of awareness, and the inadequate nature of quality training sessions closer to them [14], [15]. The above factors are more or less present in every country and have a significant impact on achieving the professional success of engineers. According to [16], the most crucial component in determining an individual's degree of productivity in achieving professional success is the ability to learn new knowledge and develop new skills. Although such studies are scarce in the Sri Lankan context, [17] has identified that entrepreneurial engineers have

supported their subordinate engineers to obtain new knowledge & develop new skills.

2.4 Economic & political factors

Economic and political aspects also play an important role in the professional success of engineers. It is noted that the engineering sector is extremely vulnerable to fluctuations in the country's economic stability and political environment. Recurrent changes in government policy, unreliable investments in infrastructure projects, and economic downturns can cause unemployment and reduce the career prospects of engineers [18]. Furthermore, a study has discussed the impact of political support and corruption on the Sri Lankan engineering profession [19]. They argue that nepotism and favoritism in government and private sector projects often lead to unfair hiring and contract awards, demotivating qualified engineers, and hampering their professional success.

2.5 Socio-cultural challenges

Social and cultural challenges, including social expectations and cultural standards, also affect the professional success of engineers [20]. It has been identified that engineers are usually expected to comply with social standards, which emphasise traditional norms rather than innovation and risk-taking [21]. These cultural expectations can limit the creativity and innovation of engineers, which are crucial to the advancement of careers in areas that require constant adaptation and problem-solving.

The literature review above highlights several types of barriers that impact the professional success of engineers. Further studies should be conducted in developing countries to refine the existing understanding of these barriers, as the findings may differ in the context of such countries.

3. Methodology

Conducting a qualitative study is the most appropriate method to explore research areas which lack previous systematic studies [22]. Not like quantitative research designs, qualitative studies have capability to identify previously unknown facts relevant to the study [23]. Therefore, this study was planned as a qualitative survey. Since chartered engineers in the country have already achieved some level of the professional success when compared with other groups of engineers like associate engineers, it was decided to collect data only from the chartered engineers in the country.

Following the convenient sampling approach, approximately 4,000 email addresses were extracted from the publicly available directory of Chartered Engineers on the IESL website. A self-administered questionnaire was sent as a Google form via email to around 4000 chartered engineers in the country. The questionnaire included a single open-ended question ("What barriers or obstacles have you encountered in achieving your professional success?") along with a few close-ended questions to gather demographic information about the study participants. Hence, this study was carried out as a qualitative survey.

This study employed the inductive approach of thematic analysis, a flexible data analysis method in qualitative research, which is useful for analyzing large volumes of participant-generated textual data [24], [25]. Responses to the open-ended question, which explored the barriers faced by chartered engineers affecting their professional success, were uploaded to NVIVO software for analysis using thematic analysis. Before starting the analysis, responses were read several times to get familiar with the data. The open coding process then began by assigning labels to the responses based on the content's meaning, with the support of NVIVO software. Later, the open codes were categorized into main themes to identify the key barriers respondents faced in achieving their professional success. The researchers engaged in the analysis process without preconceived knowledge of professional barriers from existing literature. Following the inductive approach of thematic analysis, they aimed to uncover all potential barriers embedded in the data [25].

4. Results & Discussion

Around 381 participants returned responses out of the 4000 engineers in the country. Therefore, the response rate was 9.5 %. Even though the response rate was low, researchers could collect responses from over 380 chartered engineers. Unlike quantitative surveys, which often aim for statistical significance, qualitative surveys focus on achieving data saturation – the point at which no new themes or insights emerge [23]. At the end of the analysis, authors realized that there were no new themes emerging from the data. Hence, they decided not to send the online questionnaire to another group of chartered engineers in Sri Lanka via email [25]. All responses were assigned a number, starting from 1, based on the order in which they were

received. Essential demographic findings about the respondents were as follows.

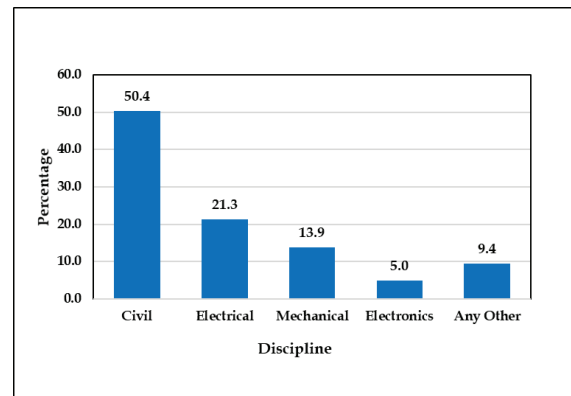


Figure 1 - Engineering Disciplines of Participants

Figure 1 shows that half of the respondents (50.4%) belongs to the civil engineering discipline, while the remaining respondents are distributed across other disciplines.

Figure 2 shows that approximately half of the respondents were employed in the state sector, while 32.8% worked in the private sector. Additionally, 9.2% of the respondents were entrepreneurs.

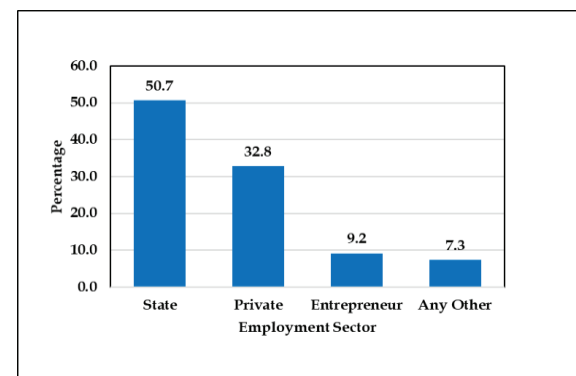


Figure 2 - Employment Sector of Participants

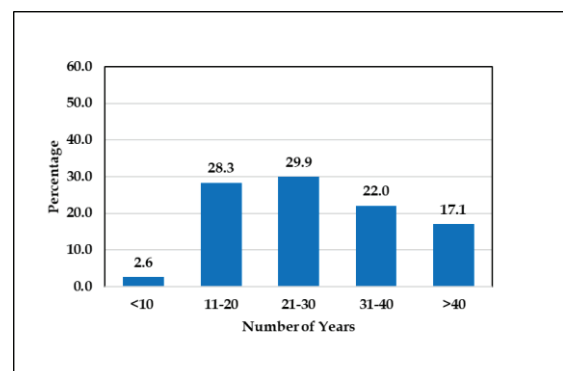


Figure 3 - Experience of Participants

According to Figure 3, the majority of respondents were experienced engineers in the Sri Lankan industrial sector, with over ten years of experience.

According to Figure 4, all respondents have obtained various educational qualifications beyond their first degree in engineering throughout their professional journey.

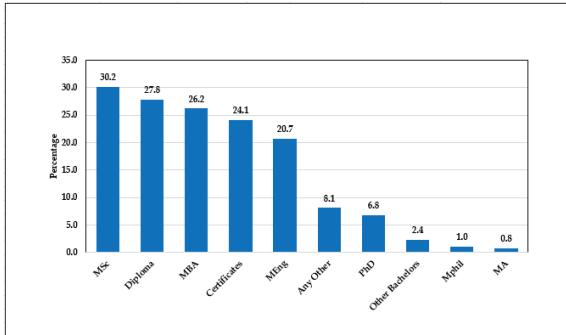


Figure 4 - Educational Qualifications (other than the first degree)

Inductive thematic analysis identified five key barriers that hinder the professional success of engineers in Sri Lanka. Table 1 presents the five major themes and their corresponding subthemes which contributed to these barriers.

Table 1 - Major themes of barriers & their sub-themes

Major Themes	Sub-themes
Ethical constraints	Unprofessional superiors, political influence, organizational politics, professional jealousy, gender issues, corruption
Knowledge & skills	Knowledge gaps, language issues, lack of communication skills, lack of management skills
Work-life balance	Lack of time, high workload, family commitments
Finance	Lower salary, high costs, lack of funds
Facilities	Lack of support, lack of training places, Unavailability of mentors, lack of opportunities
Regulations	Unnecessary rules & regulations

Each major barrier theme is further explained in the following subsections, supported by narrative evidence drawn from the responses of the chartered engineers.

4.1 Ethical constraints

The unethical behaviour of stakeholders has significantly impacted the professional success of engineers in Sri Lanka. According to their responses, a wide range of stakeholders are involved, including superiors, colleagues, subordinates, non-engineering professionals, administrators, and politicians. The unprofessional conduct of their superiors was particularly criticized by the majority of the chartered engineers.

“Senior engineers who were unwilling to work posed a significant challenge for me. They not only refrained from working themselves but also prevented others from doing so. Their primary goal seemed to be securing credit from top management and politicians, rather than contributing to the country's development or serving the public good. Their focus appeared to be on personal survival rather than the welfare of society.” (Respondent #71)

The support of the superior engineers is extremely essential for the professional development of the subordinate engineers [26]. In the case described above, respondent #71 highlighted the unsupportive behaviour of superior engineers. Such unethical conduct from superiors can significantly hinder the professional growth of their subordinates [17].

“Corrupted and professionally incompetent heads of departments/projects work to see off genuine engineers using political manipulations that caused heavy unrest among proper engineers” (Respondent #95).

This narrative further reinforces that the unethical behaviour of superiors, often driven by personal agendas, can severely impact the careers of emerging engineers. For instance, Respondent #95 recounted a similar experience at a previous workplace. Superior engineers are expected to exemplify ethical leadership that nurtures the professional growth of their subordinates. However, working under the guidance of an unethical boss can pose one of the most significant barriers to a subordinate's professional development.

“Political interventions; applied directly and also through other professionals who were acting in support of such outsiders, aimed at gaining

individual and/or political needs were the main obstacles I met" (Respondent #168).

Another major barrier faced by chartered engineers, under the broader theme of unethical behavior, is political influence. As highlighted in the narrative above, managing political pressures becomes particularly challenging when others within the organization support the corrupt actions of politicians. State-sector engineers are especially susceptible to such influences. Many respondents observed that corrupt politicians frequently interfere in organizational operations, such as internal promotions and recruitment, by advocating for unqualified individuals in key positions. This interference has significantly hindered the career progression of ethical engineers within these organizations. Therefore, minimizing political interference is essential to promote fair and merit-based professional advancement.

External political pressure is not the only factor impacting professional success. Many organizations, both in the state and private sectors, also experience internal politics and propaganda that promote favoritism and unethical decision-making.

"The corporate environment is often rife with organizational politics. Navigating these dynamics and surviving within them is one challenge, while selecting the right group to align with is crucial to ensure that career advancement is not impeded." (Respondent #03)

Respondent #3 emphasized that surviving in such a corporate environment while striving for career advancement is a challenging task. Similarly, the corrupt practices of stakeholders have negatively impacted the professional success of many respondents. Some even left their workplaces because they could not condone or support corrupt institutional practices. Such scenarios are not uncommon in a developing country like Sri Lanka, where individuals who resist corruption often face significant consequences [27]. Additionally, this study highlights professional jealousy and peer pressure as further barriers to professional success.

"Unfortunately, in Sri Lanka, another significant factor contributing to these barriers is the pervasive jealousy towards anyone achieving success." (Respondent #8)

Due to jealousy over the success of their peers, some professionals engage in practices such as undercutting and applying peer pressure to hinder the career progression of growth-oriented engineers. Additionally, this study revealed other unethical behaviors, including gender-based discrimination in the workplace, which create a particularly unfavorable environment for female engineers.

"It's very hard for a female engineer to succeed in male dominated professions. Even female senior colleagues hardly help juniors." (Respondent #350).

Female engineers have faced numerous challenges in achieving professional success within the male-dominated work environment. Gender disparity remains a persistent issue in the Sri Lankan engineering sector, posing significant obstacles to the professional advancement of female engineers [11]. If stakeholders adhere to the required work ethics, the barriers mentioned above could be reduced to some extent.

4.2 Practical knowledge & skills

According to the literature review, universities could not create engineering graduates with the necessary practical knowledge and skills expected by both local and international industries [4], [5]. This was also further confirmed in this study. The second barrier to the professional success of engineers in Sri Lanka is the lack of relevant practical knowledge and skills which need further learning.

"Engineering education is primarily academically oriented, with limited emphasis on industry applications. As a result, there is a need for additional learning to effectively apply knowledge in the workplace." (Respondent #202)

Entry-level engineers find it difficult to practically apply what they have learnt at the universities in their workplace [1]. This existing gap is highlighted in the above narrative. Most of the engineers have to study again how to apply university education to the workplace. This has retarded the rate of professional growth of engineers at the entry level [6]. Additionally, the inability to update knowledge has negatively impacted the professional success of engineers in Sri Lanka. Another significant barrier is the language proficiency issue faced by engineers at the entry level of the industry. Although engineering undergraduates in Sri Lanka carry out their



studies in English [28], considerable number of students cannot achieve the required industry required competency in English at the time of joining the industry. Since most industry operations rely on English, engineers with limited proficiency in the language are unable to fully demonstrate their potential in the workplace due to this barrier.

"One (major) barrier is language (mostly English). Some of the others are ability to communicate with the society including superiors and subordinates." (Respondent #31)

The above narrative evidence explains two barriers. They are language barrier and the lack of communication skills of engineers. Communication skills have been considered a highly sought after soft skill for engineers by industry [4], [5], [21]. The lack of such skills as an employee creates an unfavourable situation for their career progression in the highly competitive industry.

"As a young engineer, I had to work with a diverse range of people, but I lacked the ability to manage them effectively during the initial period." (Respondent #225)

Since the engineering profession often deals with technical aspects, most engineers neglect the skills development in management [1]. As highlighted by Respondent #225, lack of management skills, particularly in people handling, is a barrier to the professional success of engineers. Engineers often need to spend additional time in the industry to develop these skills, which delays their professional success. If engineers were able to enter the workplace immediately after completing their degree, equipped with sufficient management knowledge and skills, this time loss could be avoided.

4.3 Work-life balance

This study identifies the inability to balance work and life as a major barrier to professional success. A demanding profession like engineering requires effective work-life balance practices to support long-term success [21]. However, several chartered engineers have identified lack of time as a significant barrier.

"Time constraint was the major obstacle I faced during my career development." Respondent #12

Professional success cannot be achieved by solely committing to employment. It also requires engaging in activities such as

professional development and pursuing higher education [17]. However, several engineers have expressed that they do not have enough time to engage in such activities. The heavy workload associated with the engineering profession may be a key reason for the lack of time to participate in professional development.

"Once we become obsessed with work, managing the work and life becomes the biggest barrier." (Respondent # 300)

High workloads and responsibilities are common in most engineering-related jobs. However, engineers must be resourceful enough to acquire the knowledge and experience needed to innovate and find new ways to manage their work with minimal supervision, without losing control [21]. At the same time, all professionals must commit time to their personal life.

"I had limited opportunity (time) for my career development with other personal commitments." (Respondent #209)

Excessive family commitments, such as raising children and managing daily household activities, further reduce the time available for professional development. However, engineers must find ways to effectively manage their work-life balance in order to achieve professional success. It is crucial to explore the work-life balance strategies of successful engineering professionals in the country and share these practices with young engineers to help them thrive.

4.4 Finance

Various financial challenges have hindered the professional success of engineers in Sri Lanka. Issues such as lower salaries, high living costs, and lack of funding fall under the major barrier of 'Finance.' In the Sri Lankan context, there is growing concern among state-sector engineers that their salaries are significantly lower compared to those of their counterparts in the private sector.

"In government sector, I received a low salary and I had to do lot of things on weekends and night time to earn extra income." Respondent #190

This is a harsh reality for many young engineering professionals in the country. The salaries they receive are insufficient to maintain the socially accepted status of an engineering professional. As a result, these engineers often have to work additional jobs to meet basic

social standards. Furthermore, to engage in higher education and professional development activities, such as CPDs, engineers need financial resources. The high costs associated with these activities create an additional financial burden, hindering the professional development of engineers.

"Low opportunities for convenient higher education facilities (online/at evening lectures) within the manageable financial limits." (Respondent #22)

As revealed in the narrative above, Respondent #22 faced challenges in finding higher education opportunities that aligned with his financial situation. Most higher education options available in Sri Lanka have similar costs; however, some engineers find these fees difficult to manage, depending on their income.

The above narratives clearly show that chartered engineers in Sri Lanka view finance as a significant barrier to their professional success, as nothing comes free in this profit-driven social system.

4.5 Facilities

This study identifies that access to various resources is essential for engineers to achieve professional success. The lack of facilities such as support, training programs, mentors, and opportunities has hindered the professional growth of engineers in Sri Lanka.

"Lack of proper institutional support." (Respondent #5)

Similar to the above narrative, several chartered engineers have emphasized that they did not receive the necessary organizational support to achieve professional success. Organizations employing engineers must be aware of professional development needs and take responsibility for addressing them. Additionally, maintaining an ethical working environment is crucial, as it creates a stress-free atmosphere that ultimately supports employees' professional growth [16]. Excess bureaucracy can lead to cumbersome processes that hinder engineers' ability to quickly adapt, learn, and apply new skills.

"Lack of overseas/local training programs to overcome my unskilled areas." (Respondent #251)

Similarly to the above narrative, some chartered engineers have faced the barrier of finding recognized training places for their charter

training, as there are only a limited number of engineering firms in the country. This problem affected the engineers working in private sector organizations as most of such firms have not received the recognition for charter training from the IESL.

"Giving less mentorship by the seniors." (Respondent #196)

Having a supportive mentor for young engineers is highly essential to climb their career ladder efficiently [17]. Despite this, some respondents in the study have encountered barriers in finding the right mentors for their professional journey. Therefore, the IESL's current initiative to assign mentors through the MyMentor program is highly commendable in addressing this challenge.

"Lack of opportunities for career development and learning." (Respondent #313)

Opportunities for professional development are crucial for personal and career growth. The lack of sufficient opportunities to participate in professional development activities has hindered the success of engineers. The rise of online learning has been particularly beneficial for today's engineers, offering greater flexibility compared to in-person sessions. This trend became widespread during the COVID-19 pandemic and has since helped many engineers in remote areas of the country access online CPD activities organized by professional engineering associations such as IESL. Until a few years ago, most higher education and CPD opportunities for engineers were concentrated in Colombo, which created significant challenges for engineers in other regions due to limited access to these resources.

4.6 Regulations

Rules and regulations are crucial to achieve the required action and behaviour in the society. Therefore, rules and regulations are essential for the smooth functioning of any organisation [29]. However, several respondents have emphasized that some of the rules and regulations imposed by various institutions do not support their professional success.

"Many engineers in society are unable to achieve their professional goals due to unnecessary rules, restrictions, and limitations imposed by certain institutions and authorities." (Respondent #193)

According to the above narrative, Respondent #193 has observed that many engineers could not achieve their professional goals. Some institutional rules and regulations do not favour the professional development. He further stated that such institutional barriers could negatively impact the professional growth of engineers. Therefore, further research should be conducted to investigate these barriers and how they hinder engineers from achieving professional success.

"Further, present procurement processes hinder success, this is again a result of certain weakness of engineering community as all know." (Respondent #63)

It is widely recognized that the country's procurement guidelines are inherently complex. As a result, engineers often spend more time managing administrative tasks rather than focusing on technical development or creative problem-solving. Such procedures can hinder the progress of engineering projects, ultimately impacting the success of professionals. To foster a more supportive environment, organizations should aim to create flexible, inclusive, and development-oriented frameworks that promote continuous learning, innovation, and personal growth.

This study has revealed the main types of barriers experienced by chartered engineers in Sri Lanka. Similar barriers prevail in Sri Lanka are more or less available in other countries as well [3], [30], [31]. While this study provides a concise overview of the existing barriers, it does not explore how chartered engineers have overcome them. Therefore, further research is needed to examine the strategies employed by successful engineering professionals to navigate these barriers, offering valuable guidance for young engineers.

Addressing these barriers and challenges requires a collaborative effort from policymakers, industry leaders, and engineering institutions. Below recommendations can be suggested based on the findings of this study and the literature review.

- Empowering ethical behaviour among the engineering community.
- Improving access to professional development activities.
- Promoting mentorship programs within professional bodies to guide young engineers.

- Introducing standardized salary frameworks for engineers to ensure fair remuneration.
- Launching awareness sessions.

By implementing the recommendations outlined in this paper, Sri Lanka can unlock the full potential of its engineering workforce, fostering innovation and sustainable growth.

5. Conclusions

This study identified several barriers faced by engineers in Sri Lanka that hindered their professional success. Unethical behaviour of stakeholders, lack of knowledge & skills, issues of work-life balance, lack of facilities, financial barriers, and regulatory barriers are identified as the main barriers influencing the professional success of engineers in Sri Lanka. The findings of this study are representative of the entire community of chartered engineers in Sri Lanka, as data were collected from 380 respondents out of a group of 4,000 chartered engineers in the country. Therefore, this study can be regarded as a significant contribution, offering valuable insights into the experiences and challenges faced by professional engineers in Sri Lanka. Hence, the recommendations developed based on the findings of this study, can be generalized into the entire engineering community of the country.

Similarly to every research study, this also has limitations. Since the sample consists solely of chartered engineers, it does not address the barriers faced by other groups of engineers in the country. Therefore, future studies could focus on all groups of engineers in Sri Lanka, employing both qualitative and quantitative methods to expand the existing empirical knowledge on the professional success of engineers. This broader understanding would help young engineers achieve their professional goals more effectively.

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