Against all odds: women's motivation to become STEM entrepreneurs in Sri Lanka

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Abstract

Purpose – This paper aims to explore the motivations behind women in a developing South Asian country – Sri Lanka – to embark on entrepreneurship in science, technology, engineering and mathematics (STEM) fields, which is a doubly masculine hegemony operating within a culturally nuanced gendered context.

Design/methodology/approach – The study employs a qualitative research approach, conducting in-depth semi-structured interviews with 15 STEM women entrepreneurs, following the theoretical lenses of push and pull motivation theory and gender role theory.

Findings – Although the motivations of STEM women entrepreneurs cannot be exclusively categorized as either push or pull factors, the pull factors had a greater influence on the participants in motivating them to become entrepreneurs. The primary motivators for starting businesses in STEM were: inspiration from something or someone, inner calling, the identification of business opportunities, the need for flexibility, necessity and/or desire to help society. It was often difficult to identify one dominant motivator in many instances, as many factors were interlinked to motivate women to start a business. The study also revealed that gender ideologies could stifle the participants' motivation, while the inner need to break these gender ideologies implicitly stimulated their motivation.

Originality/value – The study contributes to and expands the knowledge of STEM women entrepreneurs in general and to the limited existing knowledge of STEM women entrepreneurs in developing countries specifically. The paper brings contextual novelty as Sri Lanka produces more female STEM graduates than men, which is unique compared to most other parts of the world.

Keywords Women, Entrepreneurship, Gender, Pull–push, Motivation, STEM fields

Paper type Research paper

Introduction

Entrepreneurship is indisputably crucial to a country in terms of innovation, competitiveness, employment generation, social and human welfare and economic growth (Charles and Gherman, 2013; Özsungur, 2019b). Entrepreneurship among women would lead not only to women's development but also to economic growth and achieving social equilibrium (Bui *et al.*, 2018; Kamberidou, 2020). Women's entrepreneurship is even more important for developing countries (Kuschel *et al.*, 2017) as entrepreneurship leverages economic and social development. Nevertheless, as abundant research indicates, women entrepreneurs are inundated with numerous challenges and barriers that influence their entry, success and retention (Alshebami and Alzain, 2022). Within this context, many efforts are taken by governments, international institutions and various other actors to improve entrepreneurship in general and women's entrepreneurship in particular (Alshebami and

Alzain, 2022). In this regard, entrepreneurship in science, technology, engineering and mathematics (STEM) is an important area to which many parties have paid special attention, given its heightened potential and prospects for driving economic and social growth. Yet, both women entrepreneurs in general and women entrepreneurs in STEM fields specifically are found to be scarce globally (Elliott *et al.*, 2020; Wheadon and Duval-Couetil, 2019).

Deeply ingrained cultural beliefs and gender role stereotyping beliefs, perceptions and prejudices have led both STEM fields and entrepreneurship to be accepted as masculine concepts (Jennings and Brush, 2013; Panda and Dash, 2013). The intersection of these two gendered fields is identified as a primary reason for the dearth of women professionals and women entrepreneurs in STEM (Adikaram and Razik, 2022; Kuschel *et al.*, 2017). This situation is observed to be more prominent and prevalent in cultural settings, such as Sri Lanka, a South Asian developing nation, where gender role stereotypical beliefs, expectations and prejudices are more stringent (Adikaram and Razik, 2022). Sri Lanka is a highly patriarchal country where gender role stereotyping beliefs and norms have been strictly socialized and internalized in society, affecting female participation and progress in many spheres of society. Despite women making significant advancement in many realms in contemporary Sri Lanka, including STEM fields, where they have even surpassed men in educational achievements (Sri Lanka University Statistics, 2018), these stereotypes continued to permeate career decisions, paid work and women's entry, retention and success in their careers. As Hewamanne (2020) affirms, "Sri Lankan women must also maintain a delicate balance between pursuing income-generating activities formerly reserved for men while performing culturally expected 'good women' roles" (p. 553). Hence, when women's acceptance in society and their success are measured in terms of righteous and respectable womanhood (Abeyasekera and Marecek, 2019), as well as aspects such as femininity and submissiveness, it is not surprising that their entry into masculine fields such as STEM and entrepreneurship is frowned upon. As such, a considerable gender gap in entrepreneurship exists in the country, with very few women venturing into entrepreneurship generally and into STEM fields more specifically (Jayasinghe, 2016).

However, there is limited knowledge of the reasons why some women in restrictive cultures choose to become STEM entrepreneurs. Some researchers (Kubberød *et al.*, 2021; Pogessi *et al.*, 2020) highlight that there is still relatively little research on women entrepreneurs in STEM, particularly, in developing countries (Yadav and Unni, 2016) and South Asian countries, which are often patriarchal (Gupta and Etzkowitz, 2021). The few existing studies on women entrepreneurs in STEM have mainly focused on the gender-driven barriers they face (e.g. Adikaram and Razik, 2022; Ezzedeen and Zikic, 2012; Maria, 2020; Ozkazanc-Pan and Muntean, 2018), challenges they confront (e.g. Kuschel *et al.*, 2017; Xie and Lv, 2018) and how they thrive and succeed (e.g. Martin *et al.*, 2015), with most of the studies being skewed toward the technology field (Poggesi *et al.*, 2020). Additionally, there has been inadequate research on women entrepreneurs in other fields of STEM (i.e. science, engineering and mathematics). Overall, few studies have explored the motivation of women in STEM to start their businesses (Poggesi *et al.*, 2020). Scholars in the field have emphasized the need to explore the cultural and contextual differences in what motivates women to become entrepreneurs (Cho *et al.*, 2021) and the influence of cultural edifices and beliefs on women's entrepreneurship, specifically in developing counties (Yadav and Unni, 2016).

Against this backdrop, the research objective of this study is to explore what motivates Sri Lankan women to start and remain in businesses in STEM disciplines, traditionally considered a man's field, within a patriarchal and social context where gender role stereotypes discourage women from entering entrepreneurship and STEM fields. This study uses the push–pull motivational theory and gender role theory as the theoretical lenses, as we are particularly interested in understanding the gendered nature of push and pull factors of

motivation among these STEM women entrepreneurs and how cultural norms, beliefs and gender role orientations in society interact and intersect with motivational factors.

The country context: Sri Lanka

Sri Lanka, a South Asia country with a population of 21 million, is classified as a lower-middle-income country. In 2020, the Global Gender Gap Report ranked Sri Lanka 102 out of 153 countries in terms of gender equality and gender gaps between men and women, based on factors such as health, education, economy and politics. Even though Sri Lankan women outperform men in terms of secondary and higher education enrollment and achievement, with 71% of graduates from local universities being women in 2018 (Sri Lanka University Statistics, 2018), it is disheartening to note that women's participation in the labor force is disproportionately low, accounting for only 31.8% of the total labor force participation (Labour Force Survey, 2021).

This dilemma of low female labor force participation, despite producing a higher percentage of female output in university education, appears to be a rare situation. Additionally, the gender gap in STEM education in the country shows a decreasing trend, with the recorded rate of female output from STEM fields in national universities standing at 55% in 2018 (Sri Lanka University Statistics, 2018). This higher percentage of female output in STEM fields in the country is particularly noteworthy, as reports in general and mainstream trends from many other parts of the world indicate that more men graduate in STEM fields (e.g. Quirós *et al.*, 2018).

Despite many initiatives introduced by the government and other agencies to stimulate entrepreneurship, Sri Lankans tend to choose employment over entrepreneurship. De Silva (2019) reports that less than 1.5% of the total Sri Lankan population are entrepreneurs and women account for a meager proportion of less than 10% of the total population of employers in the country. According to the Women's Chamber of Industry and Commerce (WCIC), only 10% of women are entrepreneurs in the country (Jayasinghe, 2016). It is also noteworthy that most of these women employers/entrepreneurs are engaged in *feminine* businesses such as food processing or textile (Attygalle *et al.*, 2014).

Rose (2019) argues that the underrepresentation of women in high-value entrepreneurial ventures, such as STEM-based startups in the United Kingdom, is mainly due to the gender gap in STEM education. This raises a puzzling paradox in Sri Lanka, where women with STEM education outnumber men but are still underrepresented in STEM entrepreneurship. As such, research findings on the motivations of STEM women entrepreneurs from other parts of the world may not directly apply to Sri Lanka, as the country produces more female STEM graduates than most other parts of the world.

Theoretical background

Push and pull motivation theory

Push–pull motivation theory is commonly used in entrepreneurship research to understand the factors that motivate men and women to become entrepreneurs (Kirkwood, 2009). According to this theory, pull factors are internal forces that draw a person towards entrepreneurship, such as a desire for independence, self-fulfillment or recognizing an opportunity (Kirkwood, 2009; Staniewski and Awruk, 2015). In essence, pull factors motivate individuals to achieve desirable outcomes and accomplish their goals (Cho *et al.*, 2021; Özsungur, 2019b). On the contrary, push factors are external forces that compel a person to behave in a certain way, such as job dissatisfaction, job termination or lower salary (Kirkwood, 2009; Staniewski and Awruk, 2015).

Generally, entrepreneurs in developing and developed countries appear to be motivated differently. Push factors such as economic necessity seem to drive entrepreneurs in developing countries (Benzing and Chu, 2009; Solesvik *et al.*, 2019), while pull factors such as socially driven needs motivate entrepreneurs in developed countries (Solesvik *et al.*, 2019). However, some studies report contradictory findings suggesting that entrepreneurs in developing countries may be motivated by pull factors (Shastri *et al.*, 2019). The same applies to gender differences in entrepreneurial motivation to start businesses using push and pull theories. While some scholars assert that women are more likely to be motivated by push factors (Jennings and Brush, 2013), others have found pull factors to be more important (Cavada *et al.*, 2017; Charles and Gherman, 2013; Itani *et al.*, 2011). Some studies do not show any gender differences in motivation (Orhan and Scott, 2001). Furthermore, studies also indicate contradictory findings on the motivation of women entrepreneurs in different country contexts. For example, female owners in Sri Lanka are motivated by push factors (Ummah and Gunapalan, 2013), while those in Bangladesh (Maria, 2020) and India (Patil and Deshpande, 2019) are motivated mainly by pull factors. As such, the debate on the factors that motivate entrepreneurs, *both men and women, in different country contexts*, remains inconclusive and persistent.

Gender role theory

The literature on women's entrepreneurship validates a nexus between entrepreneurship and gendered roles. Kamberidou (2020) emphasizes the necessity of incorporating the gender dimension into research on women's entrepreneurship to eliminate the waste of important talent. Eagly (1987) defines gender roles as consensus beliefs and expectations about the desired attributes of women and men. These expectations describe qualities and behavioral tendencies believed to be desirable for each gender, and societal expectations based on stereotypes can create gendered roles. These roles can either pull or push women (and men) into self-employment. Existing research indicates that the gender of the entrepreneur influences the motivation to start a business. According to the GEM global report (2019/2020), women are primarily motivated by the desire to make a positive impact in the world, while men are primarily motivated by the desire to make wealth. In a study of 300 male and female entrepreneurs in Sri Lanka, Attygalle *et al.* (2014) find that the primary motivators for starting a business were generating income for the family and capturing market opportunities. However, gender role stereotypes, norms and attitudes based on traditional customs and domestic and societal expectations can discourage women from starting businesses. These factors have a particularly strong impact on women entrepreneurs in STEM fields, where the dual masculine nature associated with the individual frames of entrepreneurship and STEM can exacerbate gender biases (Wheadon and Duval-Couetil, 2019). Women in STEM entrepreneurship often face resistance, ostracism, lack of acceptance, competition with male-dominated competitors and a lack of role models (Ezzedeen and Zikic, 2012). Thus, this study uses the pull and push motivation theory and gender role theory as theoretical standpoints to explore how gendered role expectations have impacted women's motivation to become and remain STEM entrepreneurs.

Methodology

This study used the interpretive paradigm and qualitative research methodology to conduct one-to-one, semi-structured interviews with 15 women entrepreneurs in STEM fields. These participants were selected using a purposive sampling technique based on specific criteria: (1) women owner-managers of a business/enterprise, (2) in STEM fields,

(3) with more than one year of experience as entrepreneurs, (4) whose business ventures were standalone operations without affiliation to academic or corporate research incubators and (5) those who were willing to share detailed information with us. Given the scarcity of women entrepreneurs in the STEM field in Sri Lanka, finding suitable participants who were willing to share their experiences was challenging. However, we used personal networks, professional bodies and communities of women entrepreneurs and social media to identify and approach study participants. Furthermore, we also used the snowball sampling technique to increase our reach and coverage. We concluded the interviews with 15 STEM woman entrepreneurs once we reached data saturation, where we did not discover any new information that led us to develop new categories and themes or strengthen the existing themes. Academically, the respondents were qualified in different fields, not confined exclusively to STEM. More details about the participants are provided in Table 1. We have used pseudonyms to protect the anonymity and confidentiality of the participants and the information shared.

After identifying the likely participants, we contacted them and explained in detail the study objectives to obtain their informed consent. The interviews were then conducted face-to-face and online. We started by collecting background information related to the participants (such as their education, age, marital status and their previous employments/engagements) before moving on to their businesses (such as the nature of the businesses and when they started). We then explored their motivation to become entrepreneurs, asking questions such as: What motivated them to start their business? Why did they want to start their own business? When was the first seed of the idea planted? and Why?. We also asked them to describe an event or situation that particularly motivated them to start a business and what they thought of their decision retrospectively. We also explored how the cultural context and other factors, such as family members, affected their motivation or decision to start a business. In addition, we asked about the challenges and barriers they faced in starting their businesses. On average, the interview lasted about 2 h. Interestingly, most of the women we interviewed had been employed before starting their businesses.

With the participants' consent, we digitally recorded the interviews and transcribed them verbatim for data analysis, which began with the first few interviews using thematic analysis (Braun and Clarke, 2006). We initially analyzed the transcribed interviews to identify codes, which were then collated into broader categories. These categories were then organized under main themes. Through this meticulous process of coding and categorizing, we identified eight main themes, as explained in the findings section.

Findings

Our findings indicate that women entrepreneurs in STEM fields were motivated by a complex mix of push and pull factors, which worked in tandem to encourage them to start their own businesses. These factors not only motivated the participants but also facilitated or accentuated each other. Considering the complex interplay between different motivational drivers which led the participants to start their businesses and the intervening influence of stimulators and stifles, we identified eight main themes that explained the main motivators, facilitators and barriers that described the context within which these women start businesses. The primary motivators for these women to start businesses in STEM were: inspiration from something or someone, an inner calling, seeing business opportunities, the need for flexibility, necessity and/or the desire to make a positive impact on society. In many instances, it was difficult to identify a single dominant motivator as multiple factors were interlinked to motivate women to start their businesses. However, overall, pull factors appeared more prominent in many instances.

Pseudonym	Nature of business	Age	Ethnicity	Marital status	Education
Jennifer	Information Technology (IT) – hotel booking and management system	29	Tamil	Married – no children	Higher National Diploma in software development
Manel	Electronics		Sinhalese	Divorced – 1 child	Member of Chartered Institute of Management Accounting – UK (CIMA)
Damitha	IT solutions, software development, IT solutions and IT Education	42	Tamil	Unmarried	Diploma in information technology – Australian computer society, Master of Business Administration (MBA)
Yameena	Freelance platform	32	Muslim	Married – 4 children	BSc in Information Systems and Management externally
Piyumi	IT solutions	30	Sinhalese	Married – no children	BSc
Tehani	Health, nutrition fitness, physiotherapy, sports platform	39	Sinhalese	Single	MBA
Sameera	IT	52	Sinhalese	Divorced – 2 children	Doctor of Philosophy (PhD)
Vidusha	Online sales platform	29	Tamil	Unmarried	General Certificate of Education: Advanced Level (AL), Engaged in further studies
Chamila	Medical laboratory	46	Sinhalese	Married – no children	PhD
Shobha	Dispensary	51	Sinhalese	Married – 2 children	MBBS
Hema	IT solutions	32	Sinhalese	Married	Bachelor of Business Administration (BBA)
Tharani	Food technology	22	Tamil	Single	AL
Amna	Online business services platform	36	Muslim	Married – 2 Children	CIMA
Udeshi	Organic food business	30	Sinhala	Married	BBA, professionally qualified in marketing and Human Resource Management
Oshie	Technology-based recruitment	33	Sinhala	Married with one child	PhD

Source(s): Table prepared by Authors

Inspiration from something or someone – *It just inspired the heck out of me*
Participants like Jeniffer, Hema and Piyumi were primarily motivated by the inspiration they gained from speeches by entrepreneurs about startups (in the cases of Piyumi and Hema) and workshops on startups (in Jeniffer's case). These events presented an exciting option they had not previously considered, diverting their attention from full-time jobs to entrepreneurship.
    Piyumi stated:

> I was searching for opportunities to discover myself and find my best match when I stumbled upon one of the speeches of Mr. Dulith Herath [a celebrated entrepreneur in Sri Lanka]. He was quite popular at that time as an entrepreneur. This speech was the first time I actually [thought about

entrepreneurship]. Because of his speech, I had a big realization [of what I should do]. . . .. Since I
always wanted to do things differently, I thought maybe [entrepreneurship] is the path.

Similarly, Hema had been inspired by an entrepreneur's speech.

At that conference, there was this "entrepreneur of the year," but I cannot recall his name because I
was still studying for my advanced levels at that time. After hearing his speech, all I felt like is it was
kind of cool and that is why I started to like entrepreneurship and thought of becoming an
entrepreneur one day.

The entrepreneurial drive that Hema developed at a young age provoked her to end her short
stints with corporate jobs and become an entrepreneur.

Jeniffer, who was already employed, attended a workshop on entrepreneurship, not as a
participant but as an organizing committee member from her company. The workshop had a
significant impact on her, leading her to consider switching to entrepreneurship. She was
captivated by the content on how to generate a business idea, implement it and develop a
business model. She said, "*I observed them closely and enjoyed the three-day workshop, how
businesses come into being, how ideas are generated, and everything I learned during these
three days.*" Hence, after returning from the workshop to the office, she had already made up
her mind to start her own business. With this idea, she approached her boss, who helped her
launch a hotel reservation and management software system.

Sameera's motivation to start her own business stemmed from her need to find herself
following her divorce after many years of being married with three children. She was initially
inspired by working for a tech start-up.

I was working for a start-up in New York, which was building a trading platform for Wall Street
firms. It was the most incredible experience; it just inspired the heck out of me. That thing of
entrepreneurship and working in a start-up fired my imagination.

Hence, when she needed to support herself after her divorce, she turned to entrepreneurship.

Dissatisfaction with the current career option – *but I always felt like something is missing*

Participants such as Hema and Tehani were prompted to shift from their corporate jobs to
entrepreneurship because of the dissatisfaction and lack of happiness they experienced in
their roles, despite receiving good salaries and other benefits. Job dissatisfaction is a common
reason that motivates both men and women to become entrepreneurs and it can be caused by
factors such as lack of flexibility, the glass ceiling, the inner need to be your own boss (Bui
et al., 2018; Itani *et al.*, 2011), the need for independence (Madduma and Watkins-Mathys,
2019), lack of freedom (Özsungur, 2019a) and the need of more control in one's job (Itani
et al., 2011).

Hema reported experiencing psychological dissatisfaction, feeling that she was not doing
the right thing and that something was missing.

I was earning a six-figure salary, which was definitely good. I was having a stable financial
situation. However, I always felt like something was missing. Mentally, I was not feeling all the
excitement, happiness, and satisfaction that I desired. That is why I decided that this was not
going to work for me. No matter how much I earned, I would not be satisfied. I felt that if I do not
take this step to become an entrepreneur, I will regret it for the rest of my life, that's why I made the
decision.

Tehani also experienced dissatisfaction with her job and was searching for other options.
After quitting her corporate job where she had stayed for three years, she worked as a
freelancer in advertising and marketing for about 10 years. "*I got really fed up with marketing*

and those kinds of nonsense." Hence, finally, she decided to start her own venture in search of satisfaction, happiness and the need to do something worthwhile.

Necessity – *The situation changed, and I needed to survive*
A few participants, including Manel, Damitha and Udeshi, stated that their primary motivation for starting a new venture was a necessity. Necessity entrepreneurship refers to individuals who become entrepreneurs because they have no better work options available (Parker, 2009; Williams and Williams, 2014) and is a common reason for both men and women to become entrepreneurs. For Manel, Damitha and Udeshi, this necessity arose when they lost their jobs due to various reasons, and starting a business was the best choice for earning a living.

As Manel elaborated:

> After my workplace became unpleasant. I decided to leave. I just stayed back at home. for a while . . . Then some of my friends suggested "why don't we start up something?."

By agreeing to join her friends in a new venture, Manel's suppressed need to work on her own and be her own boss emerged. Manel explained,

> Right from the beginning, I felt like I should work on my own. I always had this feeling because I believed that my knowledge and potential were not being fully utilized by anyone. I knew that one day I would become an entrepreneur and be able to work on my own.

Hence, when the necessity arose, Manel's hidden inclination towards entrepreneurship emerged, leading her to start a business. Similarly, Udeshi stated that she wanted to quit her job due to discrimination, but she wanted "*something steady at hand when she quits*." Her mother also encouraged her to start a business, as it had always been her passion. On the other hand, Damitha's situation was slightly different. She did not have any inclination to be an entrepreneur and was quite happy with her job, but the internal politics of her job led her to resign. When she was without a job, she discovered a need for IT education and software development in her geographical area, and an actual opportunity for a new venture arose. She said, "*I really didn't have a big plan of starting this kind of a software firm or academic firm or anything . . . you can consider this [starting a business] an accidental thing."*

In contrast, Sameera's necessity for survival from a traumatic divorce led her to start a business. She needed a new setting and a new life to recover, and entrepreneurship provided her with that opportunity.

> The situation changed all of a sudden, and I needed to survive. So, I went back to the US to recover . . .. Out of necessity, I knew the only way for me to survive was to start up a company.

Need for flexibility – *looking after the family is my priority*
For women, it is also common to start a business as a means of flexibility and balancing work-life to accommodate household responsibilities (Kirkwood, 2009). Similarly, a couple of participants stated that the need for flexibility and work-life balance had been their primary motivators in starting their own ventures.

Sabeetha initially worked in the government sector as a medical doctor but was assigned to a hospital quite far from her home. As her family could not relocate, she resigned from this job and joined a private hospital. Even there, different work shift systems requiring Sabeetha to work during nights led her to resign. Because of the need to be engaged in some gainful work and to make use of her education (which entailed years of hard work and training), starting her own dispensary had been the best possible option for her.

Yameena and Amna both resigned from their jobs to take care of their families. As they both stated, being *workaholics,* they had felt that it was daunting to be without a job, so they started working as freelancers and ultimately started their own businesses based on an online platform. As Yameena stated;

> I freelanced for start-ups abroad as a business consultant, and literally did everything I did at my last workplace . . . and I thought at that point, "why aren't these opportunities available for women in Sri Lanka?." I met lots of other moms and friends who had left the workforce to care for their kids because they weren't getting flexible opportunities or hours.

Having identified the demand for business analysis work that can be done online and a group of like-minded women who wanted to engage in work under flexible arrangements, Yameena became a "mompreneur," starting an online platform for gig work.

While for both Yameena and Amna, the motivation to start their business was the need for flexibility (where they wanted to be engaged in work while looking after the family), Amna stated that she had always wanted to be an entrepreneur.

> Since I was very young, I've always wanted to have my own business, and I didn't exactly know what I wanted to start and my husband mentioned this saying, why don't you use your expertise in the research industry? try and do something online.

Hence, her hidden love for entrepreneurship had come to the front when she wanted flexibility in her career. Moreover, both Yameena and Amna stated how they had been motivated by their ability to help other women like them, who have left their jobs to look after their families and look for flexible ways of engaging themselves in some gainful occupation.

Identification of business opportunities – *I saw that there was an untapped need*
Opportunity is commonly identified as a motivator for entrepreneurship, defined as instances where people pursue a business opportunity or personal interest even though other choices to earn a living are open to them (Parker, 2009; Williams and Williams, 2014). In our study, we identified opportunity as the identification of an unsatisfied need in the society/community or the market or a business opening/need by the participants, which propelled them to become entrepreneurs to fill that opportunity/opening/need. For Chamila, the main reason for starting her science laboratory was the need for quality laboratory testing for certain diseases and her confidence that it would be a lucrative business. She worked as a lead scientist at a laboratory before and suggested a new business idea to her employer who was not interested. Hence, Chamila ultimately decided to start her own business and make use of the business opportunity on her own. The fact that Chamila's employer didn't make use of her abilities contributed to her decision to start her own business.

For Tharani, too, the main motivator to start her business in food technology was identifying a business opportunity upon seeing food going to waste.

> One day, when I was traveling to Kandy for the first time after the war, I saw piles and piles of jackfruits falling under the trees, and some were kept as waste. So, I thought of a way to make these jackfruits useful without just wasting them.

Being in the middle of the civil ethnic war (which lasted for 30 years ending in 2009) in Jaffna, Tharani had experienced a scarcity of food during the war. Upon seeing food going to waste, she wondered how it could be preserved. Thus, while identifying an opportunity propelled her initially, serving society provided further motivation for Tharani to start her business. Seeing an opportunity had been a motivator for participants such as Damitha and Yameena too, although it was not the primary motivator.

Desire to help society – *Why not do something that is positively uplifting for society?*

The desire to help society was not the main motivator for many participants, who were not social entrepreneurs, except for Tehani. Her need to help the community was the primary motivator for her to start a business. Tehani, who now runs a platform for health, nutrition fitness, physiotherapy and sports, was working as a marketer when she realized that she could do something more important for society through entrepreneurship than through her marketing job.

> Why not do something valuable for the community? and so that's how it all started six years ago when I conceptualized using my interest in tech and my advertising and marketing skills to create something that could positively impact and uplift the community.

For many other participants, helping society was certainly important, while it may not have been their prime motivator. For example, creating job opportunities (e.g. cases of Manel and Hema), offering opportunities for women (e.g. cases of Hema, Amna and Yameena), helping the poor (e.g. Vidusha's case) and fostering a healthy community (e.g. cases of Tehani and Udeshi) had all played a significant role in many participants' decisions to start their businesses. Prior research has shown that women entrepreneurs are more likely to establish social ventures than commercial ones (Hechavarria and Ingram, 2016), indicating that women are more inspired by the opportunity to help others.

Stifler: paucity of encouragement by family circles

While our participants were motivated in numerous ways to start their own businesses, they also faced stiflers that hindered their progress. Many participants stated how their families strongly discouraged them when they expressed interest in starting a business. This discouragement can be attributed to cultural expectations concerning career choices. Sri Lankan culture tends to promote specific jobs, elevating them to high prestige while discouraging or looking down on others. Professions such as engineering and doctors are projected as esteemed, and careers in the government sector are also considered prestigious. As such, the parents and families of many participants expected them to pursue employment in the government sector (Jenniffer's case) or become a doctor or an engineer (e.g. Manel's case).

Gender-specific career expectations also prevail in this part of the world, where teaching and nursing are considered more suitable for women. These gender-specific career expectations are rooted in gender role stereotypes, which dictate that a women's career should be focused on looking after the family and caregiving. STEM fields are often considered masculine, and women are specifically discouraged from venturing into these fields.

As entrepreneurship goes against gendered career expectations and gender role stereotypical norms, most of our participants faced discouragement from their family circles when considering becoming entrepreneurs.

Jennifer's statement reflects the experiences of many participants,

> My parents and my relations always say, "why are you going for an IT job? Why don't you go for a government job" . . . cultural issues prevail in Jaffna and people have the mindset that "if they get a government job, that will be safe and good. If you talk about a woman doing a business, they would think, "how can she do that? what can she do?

Hema commented that,

> I resigned from my job solely because of this thing [desire to start a business] and . . . my family pressured me a lot telling me that "you should find a job and this is not going to work." They

expressed their concern stating "why are you putting your life in danger despite having a degree and CIMA qualifications? Why aren't you going for a job?" Dealing with this pressure was difficult for me.

On the other hand, Damayanthi stated how families discourage women from starting businesses because they fear that the money invested in the business will come at the expense of the daughter's dowry.

The [family] thinks that if the [daughter] started a business, they would lose their money because, in their culture, women need to be given dowries. So, they prefer not to use the money collected for dowry to invest in a business.

Surprisingly, even though some family members were businessmen (Damitha's and Jennifer's fathers who were both businessmen), the participants were not encouraged by their families to start their own businesses. Sameera articulated her thoughts, indicating the need for support and encouragement.

Basically, for individuals to strike out on their own, they need a lot of support. It's a very emotional thing to do. They need people cheering them and saying, "you go girl, you can do it." It is more negativity versus pushing them and telling them to just try.

Hence, without the support and encouragement from stalwarts in the family, starting businesses in STEM had been a predicament for the participants.

Stimulator: the need to be different or break gender role stereotypes

Studies have found that self-efficacy and self-confidence are key traits that encourage women to become entrepreneurs and succeed in their ventures (Elliott *et al.*, 2020; Özsungur, 2019a). However, deeply ingrained societal beliefs and perceptions of gender-appropriate behaviors and careers can create prejudice and discourage women from venturing into STEM fields or becoming entrepreneurs in general, leading to low self-efficacy and self-confidence and discouraging women from becoming STEM entrepreneurs. Nevertheless, many women consciously or unconsciously attempt to break these gendered barriers that arise from gender role stereotypes and societal gender role expectations and overcome discouragement from family and society to become successful in their STEM businesses due to higher self-efficacy and self-confidence.

Although the participants did not explicitly mention how they challenge gender ideologies by becoming entrepreneurs in STEM, many of their comments highlighted their need to break the norm. A few participants deliberately defied gender role stereotypes and expectations by starting businesses in STEM fields. Tehani stated:

When making business deals, for instance, you have to be assertive and confident. Women have to understand that because I see a lot of complaints from women saying that it's difficult, it's hard, all of that. But I really don't agree with that, especially in Sri Lanka, where we've had women CEOs and presidents, I don't think people have any negative connotation towards that.

As Sameera stated, self-confidence is essential to becoming a successful entrepreneur. "*I honestly don't think it's difficult, I think the difficulty exists in the mind of the person. If you believe in yourself, you can do it.*"

Discussion

Our findings suggest that the motivation behind the participants' decision to start new ventures in STEM disciplines is not a simple dichotomy of either pull or push factors. Instead, it is a complex interplay of various elements. There was no single prominent motivational

factor that influenced their decision to start businesses. The motivating factors sometimes changed over time and some were not so obvious. Numerous reasons motivated the participants, such as the need for flexibility, identification of an opportunity, being inspired by something or somebody and the need for flexibility.

Among the participants, it was common to see a combination of push and pull factors that motivated them to start new ventures in STEM fields. In some cases, it was the pull factors that were more influential, while in others, both push and pull factors played a role. Interestingly, we did not observe any instances where the participants were motivated exclusively by push factors. Furthermore, pull factors and push factors not only worked in tandem to motivate women to start new ventures but also facilitated and strengthened each other.

As prior research attests (Hughes, 2006; Kirkwood, 2009), the motivations for individuals to become entrepreneurs cannot always be neatly categorized as either pull or push factors. While Robinson (2001) identifies low income, job dissatisfaction and strict working hours as push motivators, our research finds that some participants were motivated to start their businesses due to job dissatisfaction or a desire for flexibility. Although these reasons may be considered push factors, the underlying motivation may not be straightforward, particularly when participants deliberately chose to quit their jobs due to dissatisfaction or inflexibility. In these instances, starting up a business was not the only alternative they had which pushed them to become entrepreneurs. In these instances, they had made their choices deliberately and freely (Hughes, 2003; Parker, 2009). For example, Yameena and Amna opted for entrepreneurship as a means of fulfilling their responsibilities toward their families while also pursuing their own goals. They could have chosen to work as freelancers and pursued other options. Although they also did not have to earn or contribute financially to the family, they felt a need to utilize their energy and abilities and capitalize on a business opportunity. Hence, on the one hand, Yameena and Amna were pushed to start a business because it was the primary means of gaining the flexibility to take care of their families. Yet, on the other hand, entrepreneurship was not the only choice that gave flexibility, and they were pulled into it due to their need to use their energy and capabilities (the cases of Yameena and Amna) and seeing a business opportunity (Yameena's case) or a hidden calling for entrepreneurship (Amna's case). Similarly, Sabeetha started her dispensary because it allowed her to use the skills she had acquired over the years. If not for a dispensary, she would not have had the flexibility and conducive work schedule she needed to take care of her family. These situations demonstrate the complex interplay between push and pull factors and the influence of context on the motivations of entrepreneurs.

Although men and women seem to have similar motivations for becoming entrepreneurs in general (Nasiri and Hamelin, 2018), women are often more motivated by pull factors than push factors (Uhlaner and Thurik, 2010). Yet, some research conducted in developing countries suggests that women in those contexts may be more motivated by push factors such as the need for income and employment (Isaga, 2019). Our study finds that, unlike prior findings in developing countries, pull factors are more prominent among our participants to become entrepreneurs, which is consistent with findings on women entrepreneurs in general. This difference in results could be attributed to the fact that our participants were STEM entrepreneurs, who typically have higher levels of education and operate in a field with a doubly masculine nature.

More specifically, among the push factors that motivated our participants, we could not identify financial reasons, such as earning a good income, as a motivator. This is rather interesting, considering prior findings indicating that monetary benefits can be the main motivator for women to venture into entrepreneurship, especially in developing countries (Adom and Anambane, 2019; Benzing and Chu, 2009; Isaga, 2019), including Sri Lanka (Ummah and Gunapalan, 2013). Even when participants like Manel and Damitha started their

own businesses due to necessity after losing their jobs, they did not mention money or income as a motivator. Instead, they spoke of how market opportunities (Damitha's case) or their hidden liking for entrepreneurship (Manel's case) prompted them to become entrepreneurs. One possible explanation for this is the gender ideologies present in cultural contexts that do not require women to work and earn (Tlaiss, 2015). In the patriarchal culture of Sri Lanka with its "male breadwinner" model (Withers and Biyanwila, 2014), women are generally not seen as financial providers. Hence, our participants may have aligned with gender ideological expectations and prioritized factors other than financial aspects of their career choice, such as those that are more intrinsic and non-materialistic.

Adom (2014) suggests that a lack of education may drive women to pursue entrepreneurship. However, this was not the case in our study, as all our participants were well-educated. Given the nature of entrepreneurship in STEM fields, it requires adequate knowledge and skills in the specific area. However, it is noteworthy that not all our participants had educational backgrounds in STEM fields, including Hema and Manel, who received their secondary and professional/university education in non-STEM areas such as management and finance and had previous employment in non-STEM disciplines. Despite this, they successfully shifted entrepreneurs into STEM fields.

Previous studies find that women are more prone to start social ventures rather than commercial ventures largely due to gender ideologies associated with social entrepreneurship. These ideologies are linked to feminine characteristics such as empathy, caring and altruism (Hechavarria and Ingram, 2016). While not the main motivators, many of our participants also mentioned empathy, caring and altruism as contributing to their motivations for starting businesses. The desire to contribute to societal needs is commonly observed among women entrepreneurs in developed countries (Solesvik *et al.*, 2019). According to Solesvik *et al.* (2019), this may be due to the cultural and social context in developed countries, which "offer more opportunities for female entrepreneurs for self-realization elsewhere, allowing them to focus more on societal issues in their businesses compared to emerging country contexts" (p. 684).

We were not able to identify any differences in the motivation of men and women to become entrepreneurs in STEM fields due to the lack of research in the area. However, gender role stereotypes and beliefs associated with cultural gender norms have influenced the process of starting a business and the motivation behind it. Indeed, our participants' motivations to become entrepreneurs indicate that although they are venturing into a doubly masculine context, gender ideologies drive their motivations consciously or unconsciously, either explicitly or implicitly. For example, the need for flexibility (homemakers, taking care of family and nurturing mother), the desire to contribute to society (altruism, empathy and caring) and lack of emphasis on financial aspects (where women are not expected to work or earn) represent the gendered ideologies discussed earlier. Adom and Anambane (2019) also report that women in the Nabdam district in Ghana are pushed into entrepreneurship to escape the negative effects of gender stereotyping. In our study, however, this was more of an implicit pull factor. Venturing into STEM and entrepreneurship is a means for our participants to break free from gender role stereotypical beliefs. Hence, our findings reveal a complex reality of how women are motivated to become STEM entrepreneurs in a gendered cultural context.

Theoretical and practical implications
According to Kamberidou (2020), utilizing the full potential of all human resources is essential for sustainable development. Women's entrepreneurship in STEM fields is particularly important for a country's social and economic growth; promoting and assisting women to become entrepreneurs in these disciplines is a timely and vital requirement. Furthermore,

given the high unemployment and underemployment rates of women in the country, entrepreneurship can also serve as a viable means of tapping into the unutilized and underutilized potential of women. Our study's nuanced understanding and appreciation of the entrepreneurial motivations of STEM women can sensitize girls to STEM and entrepreneurship, developing their self-confidence and efficacy levels to venture into STEM and entrepreneurship.

Moreover, our findings show that women from various disciplines venture to become entrepreneurs in STEM fields. Hence, understanding what motivates women to become entrepreneurs will undoubtedly help promote more women in the field by incorporating these learnings into training programs and motivating women to study both STEM and non-STEM disciplines. In conclusion, our findings have significant implications for the government, policymakers and organizations working to assist and promote women's entrepreneurship.

From a theoretical perspective, our study calls for a revisiting of the push and pull dichotomy (Welter *et al.*, 2017), which does not adequately explain the complex interplay of factors related to entrepreneurial motivation for women in STEM fields. Additionally, our study addresses the need for more research on women's entrepreneurship in developing countries more generally (Yadav and Unni, 2016) and women entrepreneurs in STEM fields (Poggesi *et al.*, 2020) more specifically.

Besides, as Gamage and Wickramasinghe (2012) highlight, Western entrepreneurial practices, theories and ideologies are rarely applicable to Eastern contexts such as Asia due to differences in cultural predispositions. However, very few studies exist on entrepreneurship in Asian countries and among women in STEM disciplines in the Asian context. Our study responds to these calls and addresses a pertinent research gap, contributing to the literature on entrepreneurship, STEM and gender studies.

Directions for future research

Motivation is a continuous process that drives an entrepreneur through various stages of a business (Murnieks *et al.*, 2020), and thus, it would be interesting to explore what motivates women in STEM fields not only during the start-up phase but throughout other stages of a business such as growth and exit. Such investigations can provide a better understanding of how motivation among women entrepreneurs changes at different stages of a business. Further, future research can employ quantitative methods to test the findings of our study and examine the relationships between motivational factors and other concepts such as entrepreneurial success.

Conclusion

Our findings provide important insights into why women choose to pursue entrepreneurship, particularly in STEM-related fields, an area that has been understudied (Poggesi *et al.*, 2020). Our research sheds light on how gendered beliefs and expectations shape women's motivation to start a business in STEM fields. We emphasize the role of cultural gender role stereotypes and beliefs in stifling women's motivation to pursue STEM businesses, underscoring the need for increased encouragement and support for women in this field.

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