SURVIVING THE CHILL WIND: HOW WOMEN ENTREPRENEURS IN STEM FIELDS IN SRI LANKA COMBAT THEIR CHALLENGES?

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INTRODUCTION

Entrepreneurship is undeniably the growth engine of an economy. Entrepreneurship in Science, Technology, Engineering, and Mathematics (STEM) is particularly important to growing and frontier economies such as Sri Lanka, as these fields promulgate innovation and accelerate economic growth. At the same time, women's participation in entrepreneurship is quite vital to Sri Lanka which bears a higher representation of women in the population (53.2% - Central Bank of Sri Lanka, 2020) and higher unemployment of women when compared to men (Labour Force Survey, 2019).

However, women participation in STEM carriers and in STEM entrepreneurship in Sri Lanka is very low corroborating with the situation in other countries (Institute of Policy Studies -IPS, 2014). This is especially puzzling when females impressively outnumber males in undergraduate in the STEM education programmes at national universities (55%, Sri Lanka University Statistics, 2018), which is not the case in most of other countries both developed and developing (global rate: 35%, IPS, 2020). This paradox may have been a result of the contexts of STEM Entrepreneurship, which are both gendered spaces. As per the social theory of Eagly and Karau (2002) women are expected to play a "communal role" in the society, exhibiting nurturing and socially sensitive attributes that demonstrate concern for others, while men are expected to play an "agentic role" demonstrating dominance, competitiveness and achievement orientation. Thus, when a woman acts agentically, she is often viewed negatively or with hostility since she is acting outside of her gender norms (McCullough, 2014). Thus, women entrepreneurs in STEM fields are caught in a double bind, as their journey through STEM entrepreneurship requires them to be agentic against the social expectations. Due to this, they face a plethora of barriers and challenges to enter and remain in these fields, which could be a major reason for their population to remain small (Bianco, Lombe, & Bolis, 2017; Isaga, 2019; Nguyen, Phuong, Le, & Vo, 2020; Panda, 2018). Challenges such as discrimination, formulating unattainable requirements and inadequate information on initiatives (Bianco et al., 2017), lack of infrastructure, unstable business, economic and political environments (Panda, 2018), lack of access to networks, lack of government support, serious economic recession and stagnation (Jamalie, 2009), disapproval from families (Itani et al., 2009; Jamali, 2009) and difficulties in managing work-life (Jamali, 2009; Panda, 2018) are commonly identified as barriers that women entrepreneurs face.

While there is abundant research that explore challenges and barriers women entrepreneurs encounter in different contexts (e.g. Isaga, 2019; Nguyen et al., 2020; Rahim, Fabeil, & Sung, 2017; Shastri, Shastri, & Pareek, 2019), in general, there is little understanding of how they overcome such challenges in gendered developing country contexts. This is especially so for STEM women entrepreneurs, where research related to STEM women entrepreneurs are generally scarce (Poggesi et al., 2020).

Thus the aim of this study is to explore how STEM women entrepreneurs in Sri Lanka cope and handle the many challenges and barriers faced by them in tight roping across a double masculine field in which they are double bind. Findings of this study will assist novice and potential STEM women entrepreneurs to develop combat strategies of

their own, and remain and sustain in STEM fields. This study is part of a larger ongoing project where we intend to research on many aspects relating to STEM women entrepreneurs in Sri Lanka.

METHODOLOGY

Following a qualitative approach under the broader interpretative paradigm, we conducted in-depth semi structured interviews with 15 STEM women entrepreneurs, who have been in the business for more than one year. Details of the respondents are presented in Annexure 1. Given the scarcity of the respondents, we used personal contact, social media searching, and snowballing in identifying our purposive sample.

On average, an interview lasted between 60 – 90 minutes. Interviews were tape recorded with consent and transcribed verbatim. Data analysis was done using thematic analysis (Braun & Clarke, 2006). Accordingly, the transcribed interviews were initially analyzed to identify codes, which were then collated into broader categories. These categories were then brought under two main themes.

RESULTS AND DISCUSSION

Identifying the coping strategies of the STEM women could not be done in isolation, as these strategies did depend on the type of the challenge. In this preliminary study, we could gauge two types of challenges facing STEM women- a) gender related challenges (lack of support from family and difficulties in balancing work-life) b) structure related challenges (e.g. discrimination, formulating unattainable requirements, difficulties in obtaining finances, and inadequate information on initiatives, lack of infrastructure, unstable business, economic and political environments). Indeed, some of the challenges the women faced could be managed within their agency, but there were others, that were beyond the control of the women. Specially, the gender related barriers were more within the control of the participants, whereas many structural and administrative barriers were mostly outside the control of the participants. Thus, within their agency, women were mostly reinforcing the gender structures to endure the challenges and only in rare instances were contesting them. Structural barriers appeared to be an elephant in the room among our respondents. Thus, the analysis revealed three main themes a) contesting strategies b) enduring strategies c) abstaining strategies.

Enduring strategies

These strategies revolved around succumbing to the gendered ideologies by reinforcing and adjusting the gender structures around them*.*

Prior research recommends partnering with a male to overcome the challenges women face in male-dominant fields such as STEM (Godwin et al., 2006). This was a main means through which some of our participants have reinforced gender structures. Sameera mentioned: "*I couldn't proceed as a female- engineering- Asian, I couldn't take the company beyond a certain point. So I found a solution to the problem. I hired a white male professional CEO"*. She also stated that "*Quite frankly after I hired a wonderful seventy-year- old former senior banker to help me with financial matters I've taken him for every bank visit I've done that because I find him coming along makes the whole thing much easier"*. There were 03 (Pulani, Hema and Oshie) other respondents who teamed up with male founders, only to overcome the perceived gender related barriers. Interestingly, after settling with the new venture, most of them had bought back the shares of these male cofounders.

Finding supportive husbands is also one factor that many of our respondents highlighted. Jennifer mentioned that "*Sometimes when I struggle with lack of staff, he comes and sort out it to me. And for my easy booking [the business venture] I have to travel a lot.*

Before I married him, I used to travel alone. But now, he come and pick up me and he drops me off". Amna, Yameena, Hema, and Piyumi also highlighted the support and the comfort they receive from their husbands in managing their challenges. Interestingly, women belonging to Sinhala, Tamil and Muslim ethnicities, spoke about the "supportive husband" strategy equally.

Avoiding socially objectionable behaviors is also another strategy followed by our respondents. Damitha noted: "I lost taking part in many study programmes and networking events happening in Colombo because I did not want to use public transport in a bus late which is not judged as good for a woman". This notion was mentioned by many respondents who were based outside Colombo including, Jennifer and Yadusha.

Many also stated how they give priority to household activities to gain support from the families, who considers that the main duty of a female is to the family. As the interviews indicated families fear that by the participants engaging in entrepreneurship, they will overlook the family responsibilities, giving priority to the business. Hence, by fulfilling the family responsibilities and giving priority to the same, rather than contesting the gender role ideologies, the participants were attempting to gain the legitimacy and support from the families.

Contesting Strategies

Contesting strategies were the strategies followed by our respondents challenging the status quo and these strategies were used to combat pressures, and barriers confronted by them due to noncompliance with gendered norms.

In challenging the gendered ideologies the participants appear to demonstrate more self-confidence. As Teesha stated; *"So when you are making business deals for instance you have to man up, be strong…I mean start with not expecting anything, you have to work your own way up and that kind of builds mental resilience and also skills of that kind of makes you be able to do anything. Because lot of women don't have that because it is built kind of in our Asian society to be quite submissive and passive. You have to move away from that. I think being self-reliant is a great skill to have"*.

Manel too highlighted the importance of being self-confident with a never give up attitude. *"Being independent is the most important thing. That support was the main thing because whenever I failed whenever I had issues I didn't give up"*. Being confident has helped Yameena too, where she stated how earlier she used to feel awkward and unprofessional when answering the phone call of a client when her children are around making noise in the background, but has realized that 'you don't have to be embarrassed about it'.

Hence, in dealing with customers, investors and staff, women appear to demonstrate more confidence and were attempting to overcome gendered restrictions imposed on them within the society.

Abstaining Strategies

The respondents highlighted structural and institutional barriers such as not having some tangible fixed assets to show to the banks to obtain funding, absence of proper policies and regulation on aspects such as fair trading, and ethics. Although they had identified these barriers, surprisingly they seem to follow an abstaining strategy in combating these barriers, though they are aware of the consequences of these barriers.

CONCLUSIONS/RECOMMENDATIONS

Findings of this preliminary study (which is part of an ongoing larger project) revealed that in coping with many barriers, Sri Lankan STEM women entrepreneurs follow three kinds of strategies: enduring strategies, contesting strategies and abstaining strategies. Out of which, enduring and contesting strategies were used to overcome barriers or challenges arising due to gender stereotyping and noncompliance with social norms, out of which it appears that enduring strategies are the most common strategies used, where they try to adjust the gendered structures around them. Obtaining legitimacy and support is often discussed as a strategy women use to deal with or overcome gender related barriers (Bianco, Lombe, & Bolis, 2017).

The study also revealed that women entrepreneurs in STEM fields contest the challenges, by changing their personality and mindset. This confirms with the findings of a study by Bianco, Lombe and Bolis (2017) and others, where they mention that while some women made efforts to conform to prevailing gender scripts, others became entrepreneurs as a way of contesting gender. However, it should also be noted that enduring strategies were more prevalent among the participants, than contesting.

STEM women entrepreneurs seemingly avoid combating challenges stemming from structural and institutional barriers. Although they have identified these barriers and emphasise the need to solve them, they appear to abstain from combating those barriers. As these challenges are common to both men and women, a question arises whether they want their male counterparts to pioneer solving these issues, pushing the STEM women entrepreneurs back to the square one. Exploring this phenomenon could be a future research area that would strengthen the findings of this study.

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Annexure 1 – Participant data

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