



START-UP STORIES OF TECHNO-ENTREPRENEURIAL ENGINEERS IN SRI LANKA

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ABSTRACT

Entrepreneurial engineers can be considered as valuable human resources which contribute immensely to the economic growth and development of any country. Hence, wider attention has been given to promote entrepreneurship among professional engineers in many countries. In general, billion-dollar technology-related businesses have been found and managed by innovative engineers in the international context. Although not in the billion-dollar capacity, there are still a lot of successful techno-entrepreneurial engineers in Sri Lanka whose start-up stories have not yet been revealed to the general public in the form of an academic study. This research paper investigates the motivation and challenges faced by such engineers in Sri Lankan context during the start-up phase of their firms as a part of an ongoing study based on the grounded theory approach. Data were collected by conducting face to face interviews with purposively selected eight techno-entrepreneurial engineers. Verbatim transcriptions of the audio records of the interviews were analyzed by following techniques of the grounded theory approach. It reveals that lack of experience, finance, and social issues were the major challenges they faced during the start-up stages. The findings of this study can be used at the policy level to create a favourable eco-environment for budding entrepreneurial engineers to successfully

exploit their innovative ideas and products into businesses in the Sri Lankan context.

Key words: Engineers, Entrepreneurs, Start-up, Economic Development, Sri Lanka.

1. Introduction

The majority of the world's leading techno-entrepreneurial firms were established and managed by innovative engineers. World-famous businessmen like Mr Mark Zuckerberg (Facebook), Mr Jeff Bezos (Amazon), Mr Carlos Slim (Telmex), Mr Larry Page (Google), and Mr Mukesh Ambhani (Reliance Industries) are engineering degree holders (McFadden, n.d.). Start-up stories of such leading entrepreneurial engineers are widely available in the literature and one can learn many insights from their stories. However, there is a dearth of such resources in Sri Lankan context relevant to the successful entrepreneurial engineers in Sri Lanka, at least for the reference of budding entrepreneurial engineers. As a group of professionals who have entered the field of entrepreneurship with formal education, their start-up stories might be different from start-up stories of typical entrepreneurs in Sri Lanka. Motivational factors that led them to establish their techno-entrepreneurial firms while giving up their previous employment and challenges faced during the start-up stage should be studied systematically to contribute to the existing body of knowledge on entrepreneurial engineers in Sri Lankan context.

2. Literature Review

Entrepreneurship is a widely discussed topic in the world to promote the economic growth and development of any country. Entrepreneurship has several scholarly definitions due to the multitude of studies conducted in that area. Famous economic scholar Drucker (1985) has identified that entrepreneurship consists of "creating new markets, delivering value to the customer, providing something new, changing customer value, and process innovation". As a sub-domain of entrepreneurship, technology entrepreneurship is flourishing as an emerging scholarly area. Concept of technology entrepreneurship also has various definitions and as per Dorf & Byers (2008), it can be defined as "A style of business leadership that involves identifying

high-potential, technology-intensive commercial opportunities, gathering resources such as talent and capital, and managing rapid growth and significant risks using principled decision-making skills” (p. xv). Technology intensive business opportunities are mostly exploited by innovative minded people who have knowledge and skills in technology. Innovative minded engineers, who are having entrepreneurial intentions, demonstrate a higher tendency to start up techno-entrepreneurial firms than other professionals (Thiranagama, 2015).

Entrepreneurial engineers can be identified as a valuable human resource required for any country to enhance economic growth and development. As a lower level middle income country, Sri Lanka needs the support of innovative entrepreneurial engineers in the field of technology to create new establishments to reach the international market and create new job opportunities while attracting foreign investments to Sri Lanka (Udayanganie, 2018). Hence, entrepreneurship is teaching students at schools and higher education institutions in science, engineering, technology, and management disciplines in Sri Lanka to create more and more entrepreneurs. Such education enhances the entrepreneurial intention among students which leads to starting up new ventures in the future. According to a study conducted by Pretheeba (2014) in Sri Lanka, the entrepreneurial intention of engineering undergraduates are higher than the management undergraduates in state universities as engineering students are having more areas to exploit in technology to a profitable business with their education.

Theories describing the startup stage of ventures are already developed and belong to three categories of organization, management, and entrepreneurship (Salamzadeh & Kesim, 2015). Since entrepreneurship directly deals with ideas, creativity, innovation, new products or service development, opportunity, and the like, entrepreneurship theories on startups are developed around those concepts. According to Schumpeter’s theory of innovation, profitable business opportunities are exploited by entrepreneurs when they have a novel product, procedure, market, source of supply, or organization (Schumpeter, 1934). According to Need for Achievement Theory of

McClelland, entrepreneurs demonstrate characteristics like undertaking functions in a novel and enhanced way and making decisions under uncertainty (Ricketts, 2006). People who step in to the business field as entrepreneurs face a lot of challenges, mostly in the startup stage. Many studies have been conducted around this matter and context-specific challenges are identified. Financing problems and lack of business experiences are the prominent challenges faced by the entrepreneurs generally in developing countries (Chaux & Okune, 2017; Katrodia & Sibanda, 2018). Hence, these challenges are context-specific, systematic studies should be carried out for different geographical territories in developing countries to identify them specifically. The domain of entrepreneurial engineers in Sri Lanka is still under-investigated and needs systematic academic studies to explore the grey areas in technology entrepreneurship (Thiranagama, 2015; Udayanganie, 2018).

3. Methodology

Research domains which lack previous systematic studies should be investigated by taking qualitative approaches to identify hidden insights. The main study is still ongoing and was designed as per the constructionist grounded theory methodology (Charmaz, 2006). This research was carried out as a part of that main study. Purposefully selected eight techno-entrepreneurial engineers who were also having chartered engineer status were interviewed face to face to gather data. Since there are no regulations on the ideal number of interviewees, a number between four to ten participants is satisfactory and used widely by qualitative scholars (Eisenhardt, 1989). Hence, gathering data only from eight interviewees can be justified. Interviews were voice recorded with their consent and transcribed verbatim into MS Word files for the analysis purpose. All the interview data were handled confidentially and analyzed & presented in a way that participants' identities cannot be revealed. Concepts and categories were identified relevant to the objectives of this study by employing grounded theory techniques to the interview data with the support of NVivo 12 software. Analyzed data was presented to a few interview participants to check the accuracy of interpretations and further

discussed with experts to achieve the trustworthiness of this research (Charmaz, 2006; Cresswell, 2014).

4. Results & Discussion

Interviewees have been given pseudonyms as A, B, C, D, E, F, G & H to protect their confidentiality. Here onwards, each interviewee will be referred to as A, B, and so on in this text. A, B, C, D, E, F & H are the founders of their techno-entrepreneurial firms and currently manage them as Managing Director (MD)/Chief Executive Officer (CEO) of their firms while G has taken the leadership of the particular firm which was established by another person a few years ago. G was an initial employee during the startup stage. Their entrepreneurial experiences are ranging from 5 years to 20 years as business leaders. Currently, they are running engineering related consultancy and service providing firms belong to the Small & Medium Enterprise (SME) category. Important insights revealed from the analysis of the stories of entrepreneurial engineers can be presented as follows.

4.1 Previous Work Experience

All interviewees have previously worked in the industry as engineers relevant to their field of specialization. That work experience has helped them in identifying the opportunities and their capabilities, securing some amount of initial capital, and mastering engineering practice specific to their discipline. F has mentioned, *"I have worked for more than thirteen years for the government sector and later decided to go for the private sector."* Similarly, H has said *"Actually I worked before starting my own work. I worked for three companies."* Their stories revealed that they have not stepped to the entrepreneurial field just after graduation. Entrepreneurial intentions have appeared within themselves when they came across following motivational factors with the passage of the time in the industry.

4.2 Motivational Factors

Motivational factors stimulate the entrepreneurial intentions of people and induce them to exploit new business opportunities. All the interviewees, except G, have initially started up their firms in the field they have previously worked. G also has previously worked in a similar

area and then joined the current entrepreneurial firm as an initial employee. They have identified that their practising areas are interesting and passionate for themselves. It is a major motivational factor which induced them to startup a firm in a similar field. H has explained this as *“Especially I like environmental things. That’s why I specially wanted to go for waste water treatment, waste water purification.”* G also has disclosed that *“I was really passionate about cyber security and all those things.”* D, as an owner of a structural engineering consultancy firm, has mentioned his story as *“Initially, I didn’t have lot of hopes. Because I was practicing as a structural engineer. There were lot of inquiries from various organizations whether I could work as an individual practitioner. So, I just started as an individual practicing engineer.”* Same time, they have identified the opportunities prevailing in their practising areas to exploit. H has identified it as *“And also I observed that in waste water treatment section, there are opportunities for work.”* Some interviewees have identified that their personal goals cannot be achieved by working as an employee. D has turned his concerns into the voice as *“With my capacity, I worked very hard. Then I realized that I am not fully used by those companies. And I thought that I shouldn’t, I try myself to do something.”* Few other interviewees were not happy with some of the existing practices of their previous workplaces. H has proclaimed his experience as *“I worked for three companies. In first two I got some bad experience on how they treat to client. That’s why I decided to give a good practice to the client and good product to the client and good service to the client. Therefore, I just thought to start my own work.”* As per their interviews, those are the factors that have motivated them to start their firms.

4.3 Challenges During the Start-up Stage

Challenges faced by techno-entrepreneurial engineers are multi-faceted. The following table demonstrates the categories of challenges and their properties identified from this study.

Table 1: Categories of challenges and their properties

Category	Properties
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Lack of experience	Finance, administration, business management, projects completed.
Financial issues	Insufficient capital, low profits, delayed payments from clients.
Social issues	Difficulties in securing initial projects, specialization, unfavourable eco-environment.

Source: Author developed

Although interviewees had sound technical knowledge and experience, all have confronted with challenges like lack of experience in financial, administrative, and business management aspects during the startup stage. D has mentioned all the factors as *“Engineering knowledge is definitely required to run an engineering firm. But, that is not sufficient, you must have some knowledge about administration, finance and public relationships, all those are required if you want to be a successful businessman.”* In the beginning, they don’t have evidence of works undertaken by their company. That was also a challenge. F has supported this as *“Any organization in order to get any work you know, you should have some sort of experience, that comes first.”* Engineers who are willing to enter the field of entrepreneurship must focus on developing skills required to run a business entity while facing these challenges successfully.

Financial issues are common to all entrepreneurs (Katrodia & Sibanda, 2018). Sri Lankan entrepreneurial engineers have also experienced the same. G has said, *“So when we are moving away we don’t have anyone who is sponsoring it or there are no shareholders, there was no any capital.”* H has also highlighted that *“Problem was some kind of financial capital. But I somehow carefully added some money.”* While facing capital issues, few interviewees had to work on low-profit margins at the beginning. G has mentioned it as *“somehow we have provided our services in a minimal price to make sure that we get into that market.”* Meantime, E had to face another issue. E has said, *“I think most of the companies have the same issue, that is getting the money back from the client.”*

Entrepreneurial engineers have faced various social issues during the startup stage due to the nature of the Sri Lankan society. All have faced

difficulties in securing initial projects due to the monopoly of already established business giants. C has mentioned that *"There are few companies in Sri Lanka, in which they want to grow business continuity without letting other people to come to the industry."* A also supported that claim as *"that so called big business companies which are based in Colombo are now running all consultancy businesses."* E's attitude is negative towards social support on the gradual progress of new startups in Sri Lanka. E has highlighted that *"In Sri Lanka, doing a business is a headache. And also, there are challenges you don't see in other countries. So, that's why people don't come"*. B has mentioned that *"my idea is engineers have a right to work in different fields although they are specialized in a specific field. If not engineers will not be able to become entrepreneurs and be successful in their business activities."* According to ethics, engineers shall not perform in unspecialized areas. However, B has identified it as a challenge for creating new entrepreneurial engineers in Sri Lanka. Practicing engineers and undergraduates should focus on these matters if they are having entrepreneurial intentions to face those challenges in a confident manner.

5. Conclusions & Implications

Entrepreneurial chartered engineers who had participated in this study, have previously worked as employees and that experience has supported them in entrepreneurial activities. Motivational factors like willingness to work and opportunities in the practicing area, bad practices in previous workplaces have motivated them to start new entrepreneurial firms. At the startup stage, they have faced challenges due to lack of experiences, financial issues, and social issues. Proper attention to these factors will reduce the problems faced by budding entrepreneurial engineers during the startup stage in Sri Lanka. A quantitative study can also be developed by considering this study as a foundation to explore more about the above factors of entrepreneurial engineers in Sri Lanka to generate a more generalizable outcome.

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