INVESTIGATION OF THE BARRIERS AFFECTING INNOVATION: A QUALITATIVE COMPARATIVE STUDY OF INDIAN START-UPS OPERATING IN HIGH AND LOW-TO MEDIUM TECHNOLOGY SECTORS

A dissertation submitted for the degree of Masters of Philosophy

By

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Abstract

This dissertation aims to investigate the barriers affecting innovation among Indian start-ups operating in high and low to medium technology sectors and teasing out any similarities and differences in terms of barriers by undertaking a comparative study. The study also aims to explore other "factors" differentiating Indian start-ups operating in high technology from Indian start-ups operating in the low to medium technology sectors. Two theoretical frameworks, namely the "Resource based View" (which looks at the internal perspective) and the "Institution based view" (which looks at the external perspective) are used throughout this research study. An inductive exploratory case study methodology with a thematic analysis approach to analyze empirical data is adopted in this dissertation. Qualitative semi-structured interviews are used to as the main data collection method in this research study. The findings of this study are explored on an individual basis using the two theoretical frameworks namely RBV & IBV. This is followed by the discussion chapter which presents and discusses summary of key findings and holistically explores the 9 case studies using the same two theoretical frameworks (specifically focusing on "barriers"). Various conclusions are drawn after successfully reviewing the secondary research on innovation & entrepreneurship and completing the primary research. Finally, research limitations and future research avenues are identified towards the end of the research study.

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For the ease of readership, definitions and explanations of key terms are provided will be used throughout this dissertation.

Definitions & Explanations of Key Terms
1. Start-ups (including definition of an Indian start-up) – Also referred to as Indian Micro firms

A start-up is "a young company that is beginning to develop and grow, is in the first stages of operation and is usually financed by an individual or small group of individuals (Grant Thornton, 2016 p. 6). A clear definition of a "Indian start-up" does not exist due to the subjectivity and complexity involved (Grant Thornton, 2016). Various definitions of Indian start-ups exist. In line with literature, Indian start-ups are defined as: "a business within the first three years of its existence, employing 50 personnel or less, and an annual revenue of INR 5 crore or less (equivalent to £50 million)" (Grant Thornton, 2016). The present study will be using the "number of personnel" as the main parameter to identify Indian startups. Throughout this dissertation, the author will refer to micro firms (defined as part of MSME's) as start-ups.

2. Commercialization

Commercialization is defined as "successfully bringing an innovation (product and/or service) to the market". The term "innovation is different from "invention". Innovation is concerned with making improvements (radical and/or incremental) to something that has already been invented, whereas the latter is the creation of a product for the first time. For example, Daniel Hess (an American citizen) has been credited for the invention of the "vacuum cleaner" in the 1860's (The Great Idea Finder, 2007). Any further improvements whether radical and/or incremental to this invention would be credited to James Dyson who would be called an "innovator".

3. High Technology Sector

There has been a lot of debate in defining a high-technology sector (comprising of medium to high technology and high technology (R&D intensity of which is 3% and above) because different definitions exist (Oakey et.al 1988).

In line with Medcof (1999 p.31), a high technology sector is defined as one "whose business activities are heavily dependent upon innovation in Science and Technology". OECD (1994) (defined as organization for economic cooperation and development), draws on the R&D intensity of a company, which is a useful measure to differentiate a high-technology sector from a LMT (defined as low-medium technology sector). R&D intensity is defined as the ratio of R&D expenditure to Total Sales (Reboud et.al, 2014). Existing literature confirms the following characteristics of this sector: heavier investments in R&D activities than the national average, employing a higher percentage of engineers and scientists among their personnel, offering innovative and technologically advanced products, being dynamic in nature and having short product life cycles (Oakey et.al 1988). Five groups of industries based on this degree of technology intensity have been identified: Aerospace, Computers, Office machinery, Electronics-communications, and Biomedical Industry (Medical technology, biotechnology and pharmaceuticals). As opposed to this, the industries which are "medium to high technology" are: Scientific instruments, Motor vehicles, Electric Machinery, Chemicals, other transport equipment and non-electric machinery (Hatzichronoglou 1997/2002)

4. Low to Medium Technology Sector
A low to medium technology sector (comprising of medium to low technology and low technology together) are defined as sectors whose R&D intensity is between 0-3%. Hirsch-Kriensen et.al (2008). In line with Tunzelmann & Acha, (2005), some of the main characteristics of the LMT sector include formal learning through science and technology is usually absent in LMT industries.

Also, LMT industries usually do not develop new technologies themselves but often take on technologies developed in high technology industries. Jacobson & Robertson (2006) state that firms operating in this industry rely on building strong relationships. Firms in these sectors acquire relevant practical knowledge by establishing contacts made up of actors such as research institutions, customers, suppliers, consultants, exhibitions and trade fairs. Most of the industries comprising the LMT sector are "mature and established".

Examples include: food and beverage industry, household appliances, tobacco, paper, publishing and print industry, wood and furniture industry, manufacture of metal and plastic products, foundry, rubber, shipbuilding, other manufacturing, non-ferrous metals, non-metallic mineral products, fabricated metal products, petroleum refining, ferrous metals, textiles and clothing (Kriensen & Schwinge, 2011), Hirsch-Kriensen et.al (2008), Hatzichronoglou (1997/2002).

It has been suggested in the literature that LMT sectors are often referred to as "relatively stagnant" due to their low levels of R&D activities (Hirsch- Kriensen et.al 2008), compared to high technology which has been viewed in terms of "advancement", "progression" and "modernity" (Godin, 2008). However, Rauder & Striecher (2007) state that LMT firms are surprisingly innovative and thus require support from the government. They continue to state that supporting these firms might yield positive results.

5. Medical Devices

A medical device is defined as " any instrument, apparatus, appliance, software or material or other article whether used alone or in combination, including the software intended by its manufacturer to be used specifically for diagnostic or therapeutic purposes and that which is necessary for its proper application, that is intended by the manufacturer to be used for human beings for the purpose of: diagnosis, prevention, monitoring, treatment or alleviation of disease; diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap; investigation replacement or modification of the anatomy or of a physiological process; control of conception and which does not achieve its principle intended action in or on the human body by pharmacological , immunological or metabolic means, but which may be assisted in its function by such means" (MedTech Europe 2013, p.6). They are responsible for increasing life expectancy in many disease areas, improving quality of life and allowing people to remain integrated (Med Tech Europe, 2013).

Research shows that there are 500,000 type of medical devices, which fall into 16 distinct categories as per the Global Medical Devices Nomenclature Agency Med Tech Europe (2013). These include active implantable technology; anesthetic and respiratory technology; dental technology; electro-mechanical medical technology; hospital hardware; Invitro diagnostic technology; non-active implantable technology; ophthalmic and optical technology; reusable instruments; single use technology; technical aids for disabled; diagnostic and therapeutic radiation technology; complementary therapy devices; biological derived devices; healthcare facility products and adaptations and laboratory equipment (The European Medical Technology Industry in Figures (2013).

They cover a range of products some of which are simple as well as complex in nature. For example, simple devices include: tongue depressors, thermometers, scales, latex gloves, wound dressings, hospital beds, wheelchairs, orthopedic shoes, spectacles, insulin pens, oxygen masks, dental floss, surgical instruments, bandages, and hip prosthesis The European Medical Technology Industry in Figures (2013). On the other hand, complex medical devices include: imaging equipment, lab on a chip technology, implants, pacemakers, MRI (defined as magnetic resonance imaging), scanners and life supporting machines (World Health Organization, 2010) (Med Tech Europe, 2013).

6. Medical Technology Industry

Medical Technology Industry is a part of the Biomedical Industry which encompasses the "Medical Devices and Diagnostics" segment. It is a collective noun for medical devices, Invitro diagnostics, medical imaging equipment and e-health (defined as electronic health) solutions which are used to diagnose, monitor, assess predispositions and treat patients suffering from a wide range of conditions" (MedTech Europe, 2013 p.3).

"Medical technology" industry was chosen as part of the high technology sector for the following reasons. Deloitte, a global consultancy firm claims that the Indian medical technology industry is not well documented in the Indian context and it is actually poised to reach a market value of $14billion by the year 2020 (Deloitte, 2010).

Furthermore, according to Pwc, a global consultancy firm, the medical technology industry is a promising sector in India and opportunties to innovate are immense (Pwc, 2011).

7. Economic Ecosystem

An economic ecosystem in the context of start-ups is defined as "a system comprising prospective as well as currently operating start-up entrepreneurs, their mentors, financers, trainers, large firms that provide market support, organizations such as universities, institutions etc., and government policy makers that support and promote start-ups and their inter-relationships and interactions" (Subrahmanya, 2017, p. 48).

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Author's Declaration

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Saurabh Gupta

Acknowledgements

List of Abbreviations

Abbreviation	Expanded Form
BTC	Barriers to Commercialization
B2B	Business to Business
B2C	Business to Consumer
CEO	Chief Executive Officer
EE	Emerging Economies
EU	European Union
E-health	Electronic Health
F&B	Food and Beverage
GOVT	Government
GDP	Gross Domestic Product
IBV	Institutions Based View
IBEF	India Brand Equity Foundation
IP	Intellectual Property
KPMG	Klynveld Peat Marwick Goerdeler
LMT	Low to Medium Technology
Med Tech	Medical Technology
MRI	Magnetic Resonance Imaging
MSME	Micro, Small & Medium Enterprises
NFA	Need for Achievement
NTBF	New Technology based firms
OECD	Organisation for Economic Cooperation and Development
PPP	Purchasing Power Parity
PWC	Price Water House Cooper
RBV	Resource Based View
R&D	Research and Development
SCA	Sustained Competitive Advantage
U.K.	United Kingdom
USA	United States of America

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Chapter 1 - Introduction

1.1) Purpose of the Introduction Chapter

The purpose of this chapter is to introduce this dissertation. This chapter aims to explore the background and the context of this study; India has been used as a backdrop in this study where the author explains the geography, political and economic landscape. The chapter also lays down the research problem followed by the motivations to conduct this study and the 3 research questions. This study also captures the significance/value of the study undertaken. Finally, the structure of this dissertation is also laid out.

1.2) Introduction to the Study

This dissertation aims to investigate the barriers affecting innovation among Indian start-ups/micro firms operating in high and low to medium technology sectors and teasing out any similarities and differences in barriers. The study also aims to explore what other "factors" differentiate Indian start-ups operating in high technology from Indian start-ups operating in the low to medium technology sectors. Two theoretical perspectives, namely the Resource based View, which looks at the internal perspective and the Institution based view, which looks at the external perspective, are used throughout this study to explore the topic area and eventually answer the three research questions. An inductive, exploratory case study approach is adopted in this dissertation with "semi-structured interviews" as the main data collection tool. Founders and co-founders of 9 Indian start-ups operating in high and low to medium technology sectors are interviewed in this study.

1.3) Background of the study

Liu et.al (2005) explain "technology entrepreneurship" to be the method employed by entrepreneurs to exploit technological ideas by making use of organizational resources and structures. The existing literature shows that the roots of technology based entrepreneurship are in the United States, where much of the early research has been conducted (Dahlstrand, 2007). Furthermore, the subject of technology entrepreneurship has also gained importance in Europe during the last 20 years (Dahlstrand, 2007). Research proves that "high technology start-ups" play a vital role in a country's vitality and resilience (Bruton & Rubanik,1997).

It is well known that new technology based firms are highly dependent on technology for their development and survival (Beckman et.al, 2012). It is only through innovation in Sciences & Engineering that profitable and novel opportunities emerge which can be useful for technology start-ups (Beckman et.al, 2012).

In line with Dahlstrand (2007) NTBFs defined as "new technology based firms" have the following characteristics: A higher growth potential, a need for external financing and a tendency to focus on niche markets with a high need for internationalization. In addition to this, the NTBFs cluster in specific regions; spin off from existing organizations; contribute to technology transfer within a region, and are founded by entrepreneurs with a higher education (Dahlstrand, 2007). There is no common definition of the term "technology entrepreneurship" and that there is systematic analysis is required to explore this concept further (Dahlstand, 2007). Shane and Venkataraman (2003) state that the field of technology entrepreneurship is a relatively unexplored and a young subject area. Thus, there is a need for further research in this area to further advance our knowledge.

Existing research has been conducted in the field of technology entrepreneurship in markets such as Sweden (accounting for 15% of all start-ups which are technology based) (Dahlstand, 2007), China, Iran & India. In line with a study conducted by Petti & Zhang (2011), the factors influencing Chinese technological entrepreneurship activities are: internal capabilities, external networks, institutions and the overall environment. Another mixed study, combining qualitative and quantitative approaches was conducted in the Iranian nanotechnology industry, a high technology sector. The study involved a sample size of 16 (qualitative) and 63 (quantitative) small firms. It confirmed the factors influencing technological entrepreneurship as follows: internal processes, individual factors, institutions, and external networks Pakrad et.al (2012). Till date, as far as our knowledge is concerned, no studies have been conducted which explores the factors influencing Indian technological entrepreneurship activities.

The next section aims to provide an overview of the Indian Subcontinent.

1.4) Overview of the Indian subcontinent

1.4.1) Geography of India

India is the 7th largest country by area, the second most populous country with over 1.2 billion people, the 4th largest economy in the world (in terms of PPP defined a "purchasing power parity") and the 2nd largest economy in Asia (IBEF, 2010).

1.4.2) Political Landscape of India

India is divided into 29 states. There is a central government based in New Delhi responsible for the governance of the entire country and on the other hand, state specific government (IBEF, 2010). Naidu et.al, (1997) argue that excessive government interference is directly linked to India's lack of creative entrepreneurialism. Small firms face many bureaucratic barriers, which leads to longer times, high costs incurred, and reduced speed and flexibility, thereby hampering Indian entrepreneurs to create and expand their respective ventures (Mujumdar, 2004). This is further echoed by International Economy (2006) which states that India's most important barrier to entrepreneurship centers on red tape and bureaucracies, rampant on national and state levels. Furthermore, it has been argued that these barriers often dissuade the initiatives of start-ups, as the government does not want to waste its resources on them (Naidu et.al, 1997).

1.4.3) Economic Landscape of India (including the role of MSME's)

India is predicated to become the world's largest economy by the year 2050 overtaking US & China (IBEF, 2010). Its GDP stands at $4.06 trillion and is projected to grow at over 9% annually (Europe - India SME Business Council, n.d.). It is argued that the MSME (defined as Micro, Small & Medium sized enterprises) sector has been the key engine of economic growth in India (Grant Thornton, 2011). The MSME sector accounts for 45 percent of Indian industrial output and 40 percent of exports. The total number of enterprises in the MSME sector was 46 million with total employment of 106 million (KPMG, 2015). The MSME sector in India has the potential to increase the share of contribution to GDP (defined as gross domestic product) from the current 8 per cent to about 15 per cent by the year 2020 (KPMG, 2015).

The MSME companies in India play a vital role in the economic growth of the country because of their production and export and the employment generated by them. They produce a wide range of products such as simple consumer goods to high precision sophisticated finished products (Grant Thornton, 2011).

The next section aims to provide the reader with the research problem.

1.5) Research Problem

Cobbenhagen (2000) states the need to innovate is universal, irrespective of size, sector, context or technology sophistication. Start-ups operating in both high and low to medium technology sectors are innovative and face numerous barriers whilst innovating, thus impacting their survival and subsequent performance and growth (Tidd et.al 2005). Till date limited studies have been conducted on the concept of "barriers to innovation" in the Indian context among high technology sectors, namely Rezaie et.al (2012), Jaroslawski & Saberwal (2013), Saberwal (2013), and among low to medium technology sectors Clancy (2001). Much of the existing literature on Indian start-ups have discussed high and low to medium technology sectors separately. There are no known studies in the academic literature which have studied and compared "barriers to innovation" among high and low to medium technology sectors in the Indian context – this research study aims to fill this gap. This research study believes that by successfully addressing the barriers to innovations technology start-ups (in India and elsewhere) can continuously innovate and grow their respective firms and positively contribute to their respective economies.

1.6) Motivations to undertake this research study

The researcher is motivated to fill the above research gap by finding out the barriers in each innovative sector encounters and teasing out the similarities and differences. Furthermore, the researcher is curious to find out the nature of innovations (radical and/or incremental) produced by these two innovative sectors and any other factors (apart from barriers) which differentiate these two innovative sectors. The researcher's prior interest in the field of technology entrepreneurship having completed a final year research project (as part of MSc international Management degree programme) on the topic of Indian Born Globals was also one of the

motivations to undertake this research study. Other motivational factors to undertake this piece of research was to make a difference in the world of academia by contributing this piece of research to the academic literature. Finally, the researcher wants to accomplish a holistic understanding of the phenomenon of "barriers to innovation" by focussing on both innovative sectors namely high technology and low to medium technology sectors in the Indian context.

Following from the above short discussion, this research study proposes the following research questions:

1.7) Research Questions

1. What are the barriers affecting innovation among Indian start-ups /micro firms operating in high and low to medium technology sectors?

2. What are the similarities and differences in terms of barriers to innovation among Indian start-ups /micro firms operating in high and low to medium technology sectors?

3. What other "factors" (apart from barriers) differentiate Indian start-ups/micro firms operating in high technology from Indian start-ups operating in the low to medium technology sectors.

1.8) Significance of this research study

The author of this dissertation believes that this piece of research is of significant `for the following reasons:

Firstly, this the first known comparative study of Indian start-ups which compares "barriers to innovation" among high and low to medium technology sectors thereby contributing a new piece of research to the academic literature.

Secondly, this research study makes a theoretical contribution by incorporating "psychological barriers". This factor was not considered as part of the RBV theory first proposed by Wernerfelt (1984) and then later developed by Barney (2001). This shows that even if a founder has all the resources and capabilities (as highlighted in the existing literature), lack of support from family members can psychologically discourage the entrepreneur thus giving up his dream of starting his own business.

Thirdly, current entrepreneurs (including in this research study engaged in innovations in high and low to medium technology sectors) and aspiring entrepreneurs who are planning to commence their start-ups in both high and low to medium technology sectors will find this study useful.

Through this research study, Indian entrepreneurs can identify which barriers prevent them from continuously innovating and therefore with this armed knowledge they can devise appropriate strategies to overcoming these barriers. This will enable them not only to grow their own respective start-ups but also will help contribute positively and grow the Indian economy.

Finally, this research study will be of interest to government policy makers who can devise and put forward appropriate policies/strategies such as "priority sector lending to start-ups, fixing the "Indian higher education system" which would give equal importance to theory and practice, and providing a better physical infrastructure (including research and development facilities) in India.

All these combined will help stimulate not only the growth of these innovative Indian start-ups operating in both high and low to medium technology sectors but also will give further boost to the Indian economy.

1.9) Structure of the dissertation

Following the introduction chapter, this dissertation will further comprise additional "five" chapters: Chapter 2: Literature Review; Chapter 3: Research Methodology; Chapter 4: Findings & Discussion; Chapter 5: Conclusions; Chapter 6: Limitations and Future research.

Chapter 2 - The literature review: This chapter provides the theoretical basis of this research by introducing two theoretical frameworks namely Resource Based View and Institution Based View followed by a discussion of the existing concept of "entrepreneurship and innovation". It also explores the existing literature on "barriers to innovation" among high and low to medium technology sectors (in other contexts).

Chapter 3 - The research methodology: This chapter aims to explain and justify the methodology undertaken by the researcher to answer the 3 research questions.

Chapter 4- The findings and discussion: The findings chapter present the results following empirical data collection from 9 Indian start-ups operating in high and low to medium technology sectors on an individual basis. Moving on, the "discussion chapter" will present and discusses summary of key findings and compares proposition P1 with empirical data collected and ascertain whether the empirical data provides full support, partial support, or no support to proposition P1. Furthermore, it also aims to explore the individual cases discussed in the findings chapter thematically by using RBV & IBV frameworks and specifically focusses on "barriers".

Chapter 5 - The conclusions: This chapter will provide conclusions of the research study following a review of existing literature and empirical data collection.

Chapter 6: The limitations and future research: This chapter will aim to outline the research limitations of the study that were beyond the control of the researcher, followed by fruitful future research avenues.

The next chapter looks at the literature review which will provide theoretical background followed by the concept of entrepreneurship and innovation. This will be followed by a review of the literature on the topic area of "barriers to innovation" among high and low to medium technology sectors (in other contexts).

Chapter 2: Literature Review
2.1) Purpose of the Literature Review Chapter

The purpose of this chapter is to provide the theoretical basis of this study. This will be followed by a discussion of the concept of entrepreneurship and its links with the concept of innovation. Subsequently there will be a review of the "barriers to innovation" in other contexts among high and low to medium technology sectors. A rationale of the two theoretical frameworks will also be provided.

2.2) Theoretical Frameworks

The theoretical background for this piece of research is underpinned in two strategic management views. The first is the "Resource Based" view which considers internal perspective. The second is an "Institution Based" view which takes external perspective. The next segment aims to explore these areas in detail.

2.2.1) Resource Based View

The Resource based view first developed by Wernerfelt (1984) suggests that differences in the performance of firms that operate within the same industry, are largely attributable to the differences in the assets and capabilities between them, which in turn are also necessary for creating competitive advantages (Peng, 2001) (Day, 1994). In line with Matthews (2006), resources are defined as useful assets of an organization through which productive activities are accomplished. Amit & Schoemaker et.al (1993), put forth their own interpretation of "resources", which are defined as "stocks of available factors that are owned or controlled by an organization, which are efficiently and effectively converted into final products.

The resources can be broadly classified into tangible assets (physical, financial), intangible assets (reputational, technological) and human resources (Peng et al. 2009). Tangible assets are easy to observe and quantify. They can be reported on the balance sheets of companies. Examples of these include: land, vehicles, equipment, machinery, furniture, inventory, stocks, bonds and cash. As opposed to this, intangible assets are harder to value (Peng & Meyer, 2011). It has been opined that intangible assets can facilitate to generate a competitive advantage (Peng et.al 2009). Examples of these assets include patents, trademarks, franchises, goodwill, copyrights and trade secrets (Peng et.al, 2009).

Human resources, also called human capital, encompass the skills, talent and knowledge of the employees, owners and founders of an organization (Peng & Meyer, 2011). These latter are acquired through education, social and business networks and through work experience (Peng et.al, 2009). Other factors that influence the skillset include: age, gender, personality characteristics, entrepreneurial orientation and the agility of the entrepreneur to recognize and seize an opportunity (Peng et.al 2009). Collaboration and communication amongst employees and their interpersonal interactions also play a role (Peng et.al, 2009).

Capabilities are the amassed skills and knowledge of an organization which assist them to manage its activities by employing their assets usefully (Day, 1994). Capabilities relate to the ability to attract and manage tangible assets, ability to interact with the government, the design capabilities, the flexibility and speed of response, the responsiveness to market trends and the quality and effectiveness of customer service (Peng & Meyer, 2011). A firm's resources are therefore considered its strengths, which can be utilized to implement strategies (Barney, 1991).

The next section aims to explore the strengths and weaknesses of Resource Based View.

2.2.1.1) Strengths and Weaknesses of Resource Based View

It has been well researched in the existing literature that RBV has made an important contribution to the field of strategic management (Fay, 2000). Furthermore, the RBV framework helps elucidate the reason behind varied performances amongst firms within the same industry. These variances are determined by the nature of resources possessed by a firm and its ability to strive to achieve a sustained competitive advantage (Rumelt et.al, 1991). The RBV framework basically helps to identify the resources which are absent within an organization, thereby highlighting the urgency of acquiring, maintaining and developing them, to secure sustained competitive advantage Barney (2001). RBV has been credited by scholars to be a widely accepted area for strategic management research and a good management science (Mahoney & Pandian, 1992). In line with Kraaijenbrink et.al (2010),

RBV has been defined by different authors to include resources, capabilities, organizational processes, information, knowledge and time. However, there are authors such as (Makadok, 2001), who distinguish capabilities from resources which leaves us confused about the core concept of the RBV theory. Despite its relevance in strategic management literature, RBV does not come without its critiques. Brahma & Chakraborty (2011), for example, argue that RBV theory is paradoxical, contradictory, ambiguous and incompatible for managerial practice.

Priem & Butler (2001), argue that this theory is tautological which means that it does not fulfil the parameters of an actual theory. The underlying basic statement that valuable and rare resources can create competitive advantage for firms is tautological because competitive advantage itself is defined as valuable and rare which cannot be subject to empirical testing. It is also argued that RBV can lead to "infinite regress". This means that there can be endless and futile search for crucial stock of resources and capabilities, thereby reducing the efficacy of the entrepreneurs (Brahma & Chakraborty (2011).

Furthermore, the RBV framework is static in nature, hence there are doubts regarding its relevance in today's dynamic and volatile business environment Brahma & Chakraborty (2011). Oliver (1997) argues that RBV on its own is not sufficient to explain firm-level performance variance, which leads them to suggest that it may be important to include the institutional context to understand the above phenomenon. Hence, in line with Oliver (1997), a firm's ability to use institutional contextualization (factors such as state influences, society and inter firm relations), to acquire and manage its resources, determines the level of its sustained competitive advantage. Barney (2002), states that the RBV theory only holds ground, if the "rules of the game" in an industry remain relatively fixed. However, this is not the always the case: In volatile business environments in which new technologies and new markets constantly emerge, the value of a firm's resources can change radically.

Therefore, the RBV theory cannot completely account for a firm's SCA defined as "sustained competitive advantage".

2.2.2) Institution Based View

This view suggests that an organization's performance is partly determined by institutional frameworks (Peng et.al, 2009). Institutions are informally defined as "rules of the game" (North, 1990). Institutions aim to define what conduct is legitimate and acceptable and what is not, thereby streamlining the final decision making capacity by the individuals of a firm. Hence the feeling of uncertainty surrounding the decisions made by employees in the firm is reduced. (Peng, 2006) (Lee et.al, 2007)

Formal institutions encompass all external factors such as political, economic, social, technological, legal and environmental factors, whereas, factors like national culture constitute the informal institutions (Peng et.al, 2009). The economic landscape (part of formal institutions) such as levels of interest rates for loans, economic stability of the home country etc. and the legal regulatory landscape which is also managed and supported by the home government, also affect entrepreneurship (Todd & Javalgi, 2007).

On other other hand, the national culture (part of informal institutions) of a country is defined by its Individualism, Uncertainty avoidance and Masculinity (Hofstede, 2018). The concept of "Uncertainty Avoidance" determines whether that country encourages or impedes entrepreneurship (Hofstede, 2018). The Masculinity dimension represents the extent of the preference in a society for achievement, heroism, assertiveness and material rewards for success. Furthermore, a masculine culture is more competitive (Hofstede, 2018) (Mueller & Thomas, 2000), McGrath et.al (1992b). For example, a country in which there is high individualism, high masculinity and low uncertainty avoidance will encourage entrepreneurship such as the United States. This is in sharp contrast to India where its national culture is determined by intermediate individualism (comprising elements of both collectivist and individualistic traits), high masculinity and medium low preference for uncertainty (Hofstede, 2018).

Both formal and informal institutions can affect entrepreneurship. Formal Institutions can affect entrepreneurship through government policies, for instance support provided by the home government which includes providing good infrastructure, a vibrant ecosystem and efficient distribution channels.

The next section explores the strengths and weaknesses of Institution Based View.

2.2.2.2) Strengths and Weakness of Institution Based View

The advantage of the IBV framework is that it can help understand differences in firm performance within the same industry as this can be attributable to the differences in their underlying formal and informal institutions (Glober-man & Shapiro, 2009). Institutions directly determine the armamentarium possessed by a firm, as it struggles to formulate and implement strategy to accomplish competitive advantage. (Ingram & Silverman, 2002). The IBV framework is not only useful in the domestic context where it can facilitate entrepreneurship, but also in the international context. The IBV framework helps guide managers to plan to expand their business internationally, by making them aware of the potential host country's formal and informal institutional context.

However, it may be argued that the IBV theory might not be applicable under certain circumstances. For instance, firms operating within the same geographical area are subject to similar formal and informal institutions, however their performance can still differ. This can be explained by differences in their resources, networks and networking capabilities: all of which are part of resource based view (Peng & Luo, 2000). This point is further re-enforced by Peng & Luo (2000) who state that reliance on inter-firm relationships (part of the RBV realm) could guide formulation of firm strategy which in turn contributes to the growth of the firm and growth of the economy. It can be concluded from the above discussion that both RBV & IBV frameworks have their own advantages and disadvantages that helps to explain differences in firm performance.

The next segment explores the theme of "Entrepreneurship".

2.3) The Concept of Entrepreneurship

Fundamental to the concept of Technology Entrepreneurship is the concept of "Entrepreneurship".

The next section aims to explore this in more detail.

2.3.1) What is Entrepreneurship

There is a lot of debate pertaining to the "exact definition" of the concept of "entrepreneurship" (Shah.et.al (2005). Various authors have provided their own interpretation of the term "entrepreneurship".

Research shows that the concept of "entrepreneurship", a rich and complex phenomenon and a young field of study, can be viewed from several different angles. Various authors have provided their own interpretation of the term "entrepreneurship". For example: Shah et.al (2005 p.183) defined the term "entrepreneurship" as "a process of creating value by bringing together a unique combination of resources to exploit an opportunity". On the other hand, Venkataraman (1997, p.119) put forward the concept of entrepreneurship as "a scholarly field which seeks to understand how opportunities can become a reality, how future goods and services are discovered, created and exploited by whom and with what consequence". Low (2001 p. 21) defines entrepreneurship as the "process of identifying, valuing and capturing opportunity". He further posits that entrepreneurship occurs under the following three conditions: uncertainty, tight resource constraints and the drive of an individual initiative. Finally, Johnson (2001 p.138) defines the term "entrepreneurship" as "capturing ideas, converting them into products and services and then building a venture to take the product to the market". This is in line with Parker (2009) who confirms this point of view. For the purposes of this research, the definition of Johnson (2001) is adopted throughout this piece of research, as it covers all the important terms and is easy to understand.

Entrepreneurship involves commercialization of innovations that are not only driven by entrepreneurial factors which include motivations, characteristics and firm resources (RBV) but also are largely driven by the external factors within which these entrepreneurs operate (IBV) (Shah et.al, 2005).

This study is hence, theoretically based on the possession of firm resources (RBV) and external factors (IBV) affecting a start-up firm. Additionally, the term "Entrepreneurship" is a multidisciplinary concept and has academic underpinnings in sociology, psychology, and economics Gregoire et.al (2006).

Venkataraman (1997) states that the field of entrepreneurship is based on two principles: Firstly, human enterprises that are driven by new knowledge and technologies and enticed by profit, will destroy the market equilibrium. Secondly individuals differ with respect to their abilities to identify and exploit opportunities. In addition to this, there is a long-standing debate, which focusses on whether entrepreneurs are born or made. It is argued that individuals can acquire some personality traits like NFA (defined as need for achievement), & locus of control. Some traits like high energy are innate and cannot be acquired by individuals thus terming the latter as "born entrepreneurs" (Westhead, et.al 2011). Furthermore, entrepreneurship can occur in a variety of contexts such as start-up ventures, small firms, mid-sized firms, large conglomerates, non-profit organizations and public sector agencies. Entrepreneurship acts as a driving force for economic growth as it is not only increases productivity but also creates new jobs (Shah et.al 2005).

Entrepreneurship as a subject area has generated an extensive academic interest. Scholars are concerned that the field of entrepreneurship is fragmented and thus can hold back scholarly development (Uchasaran et.al, 2001). This is further echoed by other scholars who have observed that the field of entrepreneurship remains highly fragmented and is still in its adolescence, resulting in a barrier to scholarly development (Low 2001). However, in the words of Gregoire et.al (2006) who provides a contrasting viewpoint to the above, "there is proof of maturity and convergence in this field". They state that a variety of theories, models and methods have emerged

Finally, it is stated that the concept of entrepreneurship is closely related to the concept of innovation, therefore, it is important to understand the concept of innovation.

The next section aims to explore this in more detail.

2.3.2) Concept of Innovations and its links with Entrepreneurship

Innovation is defined as to how an organization can achieve sustainable growth. It also addresses some of the issues facing firms in today's dynamic competitive environment (Senge and Carstedt, 2000). In line with literature, innovation is defined as "new products, new processes, new services (including new use of established products, processes and services), new forms of organization, new markets and the development of new skills and human capital (Zhao, 2005 p. 5).

The concept of innovation is multi-dimensional and it can be classified into three dimensions: Radical vs Incremental; product vs process; administrative vs technological (Cooper, 1998). Radical innovations are referred to as revolutionary and original innovations whereas incremental innovations are referred to as small improvements for the purposes of enhancement or extending established products, services and processes (Green et.al, 1995). Product innovation is defined as changes in the product offered by the organization whereas process innovation is defined as changes in the way organizations produce end services (Cooper 1998). Technological innovation is defined as adopting a new idea which directly influences the basic output processes whereas administrative innovation is defined as all those changes that affect the policies, resource allocations and other factors associated with the social structure of an organization (Cooper, 1998).

Herbig et.al (1994) state that innovation encompasses three components: infrastructure, capital and the entrepreneurial capacity which is important to make the first two components work effectively. The importance of innovation is magnified because of increased global competition, decreased product lifecycles, increased technological capabilities of firms and changing consumer demands (Gujarro et.al, 2009). On the other hand, Johnson (2001) stated that "entrepreneurship is about creating something that did not previously exist. The creation adds value to the individual and the community and is based upon perceiving and capturing an opportunity, thus, an individual who creates a new organization based on a new idea is referred to as an "entrepreneur" (Zhao, 2005).

Zhao (2005) proposed that both entrepreneurship and innovation are complementary and interact to help an organization to thrive. Their combination is vital to an organization's success in today's dynamic and changing environment. Furthermore, both entrepreneurship and innovation are not restricted to the initial stages of a new venture. (Zhao, 2005) and that innovation is the specific tool of entrepreneurship by which entrepreneurs exploit change. Sundbo (1998), identified an entrepreneur paradigm in relation to innovation. He states that the entrepreneur paradigm roots can be traced back to the 1930's when Schumpeter (1934), stated that an entrepreneur is basically an innovator. It can be argued that innovation contributes to the growth of an economy, because entrepreneurs produce innovations (Schumpeter, 1934). In line with Schumpeter (1934), entrepreneurs play an important role not only in the creation, but also in the commercialization of innovations. In line with Nevens et.al, 1990, bringing a new product or a service to the market provides numerous business benefits, survival of the venture, higher profits and better market share. These business benefits will not be realized if technology entrepreneurs face barriers to innovation. Therefore, it is important to study what these barriers to innovation are and how they can be addressed.

The next section aims to explore these barriers in more detail.

2.4) Barriers to Innovation
2.4.1) Barriers to Innovation among start-ups operating in high and low to medium technology sectors (in other contexts)

Today's business environment is characterized by dynamism and change which forces start-ups to innovate (Amit & Zott, 2001). Failure to innovate is likely to result in reduced competitiveness, slower growth, poor profitability and reduced productivity (Amit & Zott, 2001) (Senge & Carstedt, 2001) (Farsi &Toghraee, 2014). Therefore, it is imperative for start-ups to understand and develop strategies to reduce these barriers to innovation which can be observed not only at the product manufacturing stage but also the commercialization stage. Successfully addressing these will not only grow their respective start-ups but also help grow their respective economies.

Table 1 (types of barriers in other contexts) outlines the different types of barriers encountered by start-ups operating in high and low-to medium technology sectors (in other contexts).

Table 1 – Types of Barriers (in other contexts)

Types of Barriers	Academic Studies
Financial Barriers Lack of Funding (Internal and External)	Blasco (2008), Farsi & Toghraee (2014), Larson & Lewis (2007), Xie et.al (2010), Bozic & Rajh (2016)
Competence Barriers Lack of skilled personnel, high staff turnover, lack of technical experts,	Blasco (2008), Larson & Lewis (2007), Xie et.al (2010),
Organisational Barriers Lack of knowledge on new product development process	Larson & Lewis (2007)
Legal Barriers Lack of proper national policy and regulatory environment	Farsi & Toghraee (2014), Bozic & Rajh (2016)
Risk Barriers [1] Competitors copying products	Larson & Lewis (2007)
Market Barriers Lack of information on technology and markets, inability to find suitable partners, saturated target market	Blasco (2008), Farsi & Toghraee (2014), Xie et.al (2010), Bozic & Rajh (2016)

This research study notes that lack of financial resources is one of the highest-ranking factors in the existing literature reviewed.

Lack of funding, (both internal and external) is reinforced by Bhide (1998) who conducted a qualitative study in a developed economy such as the United States of America on a sample size of 500 fastest growing start-ups operating in both high

technology and low to medium technology sectors. They stated that technology start-ups often suffer from capital constraints.

Around 95% of the founders of these start-ups, bootstrapped their ventures by mainly using personal savings and securing funds from social networks such as family and friends. Bhide (1998) pointed out that only 5% of the start-ups had venture capitalist backup. Furthermore, securing loans is a challenge, as bankers perceive lending these small enterprises as risky, due to their poor repayment history and low market credibility. (Todd & Javalgi, 2007). The establishment of better networks, both business and social, would enable entrepreneurs to tackle these barriers.

The literature also shows that there are a variety of barriers that can impede entrepreneurial success. The barriers can be classified in different ways. For example, those barriers that reflect the Resource Based View including lack of funding from internal sources, lack of skilled personnel, high staff turnover, lack of technical experts. Those barriers that can be classified as reflecting the Institution Based View include lack of funding from external sources, lack of information on technology and markets, inability find suitable partners for cooperation, lack of proper national policy and regulatory environment, competitors copying products, lack of knowledge of the new product development process and saturated target market.

Based on the above studies and a short explanation of the classification of barriers into RBV & IBV respectively, the following proposition can be drawn based on the order of importance:

P1) Lack of funding (internal and external funding), lack of information on technology and markets, inability to find suitable partners, saturated target market, lack of Skilled personnel, high staff turnover, lack of technical experts, lack of proper national policy and regulatory environment, lack of knowledge on new product development process, competitors copying products

These factors are applicable to start-ups in other contexts. These may or may not be applicable to Indian start-ups operating in both high and low to medium technology sectors.

The next section explores the "rationale" for using the two joint RBV & IBV theoretical frameworks in this research study.

2.5) Rationale for using RBV & IBV Theoretical Frameworks

Two theoretical frameworks namely the "Resource Based View" (internal) and the "Institution Based View" (external), proposed by Barney (1991) and other scholars, and Peng & Meyer (2011), respectively. These two theories were used throughout this research study and facilitated in successfully answering the 3 research questions despite their respective strengths and weaknesses.

The researcher argues that the concept of "entrepreneurship" and "innovation" (interlinked concepts as outlined in section 2.3.2) cannot be understood by focussing just on "RBV" or "IBV" instead both these theories must be combined due to their complementary nature. Furthermore, the primary research conducted in this research study demonstrates that both internal resources and/or capabilities (RBV), formal institutions such as political, legal and economic factors (IBV) and informal institutions (national culture) (IBV) were key factors which prevented Indian founders/co-founders to commence their new ventures, manufacture and commercialise their respective innovations in the Indian market. In addition to this, the literature reviewed on barriers to innovation in both high and low to medium technology sectors confirms that barriers to innovation faced in were both internal and external in nature.

The next section summarises the literature review.

2.6) Summary of the Literature Review

In summary, two strategic management views have been introduced: The Resource Based View and the Institution Based View, which form the basis of this research study. Furthermore, their respective strengths and weaknesses are also noted. The researcher has also outlined the rationale for using the two theoretical frameworks.

The concept of entrepreneurship was also discussed. Multiple definitions of entrepreneurship have been put forward by various authors. There are varied views and debates surrounding the concept of entrepreneurship. This is not a widely-explored area and deserves further extensive research. Entrepreneurship has been closely linked to the concept of innovation. In fact, entrepreneurship is considered equivalent to Innovation in line with some authors. As entrepreneurship contributes to the growth of the economy, innovation can also lead to economic growth. Finally, the literature has shown that various barriers affect the innovation process and financial barriers have been noted as the highest-ranking barrier. This research study argues that these factors (in other contexts) may or may not be applicable to the Indian context.

The next chapter looks at the "research methodology" to explain and justify the methodology used, to answer the research questions.

Chapter 3 - Research Methodology
3.1) Purpose of the Research Methodology Chapter

The purpose of this chapter is to review and discuss the methodology undertaken in this study to answer the research questions.

3.2) Research Philosophy

Research Philosophy is defined as "an overarching term relating to the development of knowledge and the nature of that knowledge" (Saunders et al., 2009 p.107). Research shows that the research philosophy adopted, determines the assumptions regarding the way one views the world. These assumptions will also guide the research strategy and the methods one chooses as part of that strategy.

There are three major ways of thinking about philosophies: ontology, epistemology and axiology (Saunders et al, 2000).

Ontology is concerned with nature of reality.There are two aspects of ontology: objectivism and subjectivism. objectivism assumes that social entities exist in reality which are external to social actors, for example: management. Subjectivism assumes that social phenomena are created from perceptions and consequent actions of social actors. It is important to understand and explore the subjective meanings that motivate the actions of social actors in order to understand these actions (Saunders et. al, 2000)

Epistemology philosophy is concerned with what constitutes acceptable knowledge in a field of study. There are two types of researchers: the resource researcher focussing on facts or objects and the feelings researcher who is concerned with feelings and attitudes. It is stated that the resource researcher follows a positvist position to the development of knowledge whereas the feelings researcher adopts an interpretivist approach, the feelings researcher adopts empathetic stance and enters the social world of the research participants to understand the world from their perspective (Saunders et.al, 2000)

Axiology philosophy studies judgments about value. Heron (1996), argues, that values are the guiding reason for all human action and are important in all stages of the research process. During the research process, the researcher will be demonstrating their values. For example: choosing one topic rather than other, choice of philsophical approach and the choice of data collection techniques, is a reflection of the researcher's values.

In this study, both epistemological and axiological philosophies are used. The researcher is concerned with subjective meanings thus acting as a feelings researcher and wants to explore the social world from the research participants perspective. Furthermore, the researcher's own values are guiding this research study for example: using interviews as opposed to questionaires as the choice of data collection technique: the researcher values personal interaction (in the form of interviews) to expore the topic area and eventually answer the 3 research questions.

3.3) Research Approaches

3.3.1) Deductive and Inductive Approach

There are two main approaches used in research: the deductive and the inductive appoaches. In line with Bryman & Bell (2007), the question is whether data is collected to test theories or build theories. In an inductive approach, conclusions are derived from empirical observations leading the researcher to offer theories and hypotheses (Ghauri et.al, 2005). In a deductive approach, theories are considered in order to produce hypotheses or propositions. These theories are then tested by data collection thereby rejecting or accepting the hypothesis or propositions. In this study, an inductive approach is used as whereby the researcher will derieve conclusions from empricial observations.

3.4) Research Design

The research design of a study can be discussed using the following approaches: exploratory, descriptive or explanatory (Saunders et al., 2009). An exploratory study is a means to find out what is happening, to seek new insights and to assess a exisiitng phenomenon in a new light (Robson, 2002). Furthermore, this type of sudy is useful if the researcher wishes to clarify one's understanding of a problem.

There are three ways to conduct this type of study: searching the literature, interviewing experts in the subject and conducting focus groups interviews. One of the advanatges of this study is that it is flexible and adapatable to change.

Descriptive studies are study whereby there is a potrayal of accurate profiles of persons , events and situations (Robson, 2002). A clear picture of the phenomena is required, which is the basis of data collection.

The third type of studies are explanatory studies which can be described as studies which can establish causal relationships betweeen variables.
The reasearcher studies a situation or a problem in order to explain the relationship between variables (Saunders et al., 2009).

In this study, an "exploratory" research design is adopted in order to seek new insights and to assess an existing phenomenon in a new light in this case the concept of "entrepreneurship" which is a very controversial topic due to its various interpretations (Saunders et.al, 2009). Furthermore, this research design will give the researcher an opportunity to ask open ended questions by interviewing experts thus answering the 3 research questions.

3.5) Research Strategies
According to Yin (2003), there are seven research stategies and each strategy can be used for exploratory, descriptive, and explanatory research. These include: case studies, experiments, surveys, action research, use of grounded theory, ethnography and archival research (Saunders et.al 2009).

Each strategy has its own advantages and disadvantages and that the chosen strategy should aim to answer the research question (s) (Yin, 2003). The choice of a research strategy is influenced by a range of factors such as: research question, extent of existing knowledge, the amount of resources available as well as the philisophical underpinnings, the research approach and the type of the study (Saunders et.al, 2009).

The next section aims to provide the reader with an overview of the "case study" strategy (including its strengths and weaknesses).

A case study is defined as "a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence" (Robson, 2002, p.178). This type of strategy is useful if the researcher wishes to generate answers to the questions "why", as well as "what" and "how" questions. A case study approach is useful if there is desire to explore, validate or challenge existing theory. This type of strategy is used in exploratory and explanatory research. In line with Morris and Wood, (1991), this strategy will be of interest to researchers who want to gain a rich insight into the context of the research. The data collection techniques for a case study strategy are varied which include interviews, observations and questionnaires.

According to research there are a variety of strengths and weaknesees of a case study approach: The strengths being that the results are easily understood by a wide range of audience and self explanatory as they are written in everyday language (Cohen et. al, 2007). Case studies possess certain unique characteristics which might be lost in large scale surveys and they can be undertaken by a single researcher without the need for a whole research team to get involved (Cohen et al., 2007).

However, there are certain limitations of the case study approach. Case studies are not easily open to cross checking and they can be interpreted to be biased and subjective (Cohen et.al, 2007). They are prone to observer bias , in that there can be the formulation of an opinion, which can then be carried forward during the course of the study (Cohen et al., 2007).

The current research project hence, adopts a case study based strategy, because this study is exploratory in nature and the topic being studied aims to provide new insights. Furthermore, the researcher is interested in interviewing experts in the field of technology entprereneurship and generating answers to the questions starting with "why"/ what"/ "how".

Finally, this strategy will help the researcher to validate and/or confirm the exisiting theories explroed as part of the literature review (Resource Based View & Institution Based View).

3.6) Research Choices

Three types of research choices are described by Saunders et.al (2009): Qualitative, Quantitaitve and Mixed Methods. Qualitative study is a method of inquiry which is synomyous for any data collection technique such as an interview or data analysis procedure, such as categorising data, that makes use of non-numerical data (Saunders et.al, 2009). It can also include pictures and videoclips. A quantitative study on the other hand, is a method of inquiry which is synonmyous for any data collection technique, such as a questionnaire or data analysis procedure such as graphs or statistics, that makes use of numerical data (Saunders et.al, 2009). Mixed methods is a general term given, when both qualitative and quantitative data collection techniques and analysis procedures are used (Saunders et.al, 2009).

In this study, an exploratory qualitative approach is adopted as the researcher wants to adopt a personalised approach by entering the social world of research participants and conduct semi structured interviews. By doing this, the researcher will get an enhanced understanding of "entrepreneurship" and eventually answer the 3 research questions outlined in this research study.

3.7) Case Study Company Selection

All Indian technology start-ups selected as part of this study were located in different parts of India – Bangalore, Tirrupur, Hyderabad, Rajkot and Noida. The research participants were mainly founders and co-founders of these technology start-up companies. These interiviews were conducted during May 2016, June 2016 and Dec 2016 and March 2017. Each interview lasted anywhere between 16-35 minutes depednig on how much time respondents allowed for each question. All the research participants interviewed had very tight time schedules and for this reason they could not be interviewed for longer periods. For the purposes of confidentiaility, pseudonyms were assigned to start-ups and the research participants interviewed.

As part of the empirical data collection, Linkedin (a business networking site) was utilised to identify the Indian technology start-up companies operating in both high and low to medium technology sectors.

High Technology:

A total of 50 Indian technology start-ups operating in the high technology sectors (specifically the medical technology industry) were identified using the business networking site – Linkedin. The researcher used the "search" button (area of Linkedin) and punched in the key terms : medical devices, india and start-ups to get a search list. By going though the search list and clicking on indvidual companies and reading through the sections namely "about us" and "company details", the researcher was able to confim that these were start-ups. This was further confirmed by looking at the company size (part of company details) which indicated no: of personnel less than 50 (inclusion criteria used in this study). The main attributes of these companies were that they were that they were operating in the medical technology industry (high technology sector) in India and employing less than 50 personnel which led the researcher to include them in the study.

The researcher got a sample of 50 companies following the above process and founders/co-founders of all these 50 companies were sent a connection request on Linkedin. Out of the 50 companies, 30 did not respond at all. A connection request was accepted and contact details were exchanged from 20 companies and were provided with a overview of the project. Out of 20 companies, 17 companies who responded stated their interest in the project but had not time to partcipate. Only 3 companies stated their interest in participating in the project. They were thanked for their time and the project brief was explained in detail by liaising with them through whatsapp – a telephonic mobile application tool and following that a mutual date and time for video skype interviews was setup. Before the interview, two word documents: interview participation invitation letter (Appendix 4) and interview questions (Appendix 2) were sent as email attachments. Empirical data was successfully gathered from 3 Indian start-ups operating in the high technology sectors operating in the medical technology industries.

Low to Medium Technology:

A total of 71 Indian technology start-ups operating in the low to medium technology sectors were identified using the business networking site – Linkedin. The researcher used the "search" button (area of Linkedin) and punched in the key terms such as "food and beverage", "india and start-ups, funiture" india, start-ups, "textiles" india and startups, "wood", india and start-ups, "paper", india and start-ups to get a search list. By going though the search list by individual industries and clicking on indvidual companies and reading through the sections namely "about us" and "company details", the researcher was able to confim that these were start-ups.

This was further confirmed by looking at the company size (part of company details) which indicated no: of personnel less than 50 (inclusion criteria used in this study). The main attributes of these companies were that they were that they were operating in food and beverage, furniture, textiles, wood industry (low to medium technology sector) in India and employing less than 50 personnel which led the researcher to include them in the study.

The researcher got a sample of 71 companies following the above process and founders/co-founders of all 71 companies were sent a connection request on Linkedin. Out of 71 companies, 48 did not respond at all. A connection reqyest was accepted and contact details were exchanged from 23 companies and were provided with an overview of the project. Out of 23 companies, 17 companies inidcated their interest in project but had no time in participating. Only 6 companies stated their interest in participating in the project. They were thanked for their time and the project breif was explained in detail by liaising with them through whatsapp – a telephonic mobile application tool and following that a mutual date and time for video skype interviews was setup. Before the interview, two word documents: interview participation invitation letter (Appendix 4) and interview questions (Appendix 2) were sent as email attachments. Empirical data was successfully gathered from 6 Indian start-ups operating in the low to medium technology sector operating in different industries: these were food and beverage, textiles and furniture.

3.8) Tools and Procedures

There are various data collection techniques to carry out a qualtiative research (Saunders et.al, 2009). Some of the qualitative tools which can be employed are: observations, focus groups, questionnaires and interviews (Saunders et.al, 2009).

Observations are concerned with " systematic observations, recording analysis and interpretation of people's behaviour". (Saunders et.al, 2009 p, 596). Research participants are observed and there is no active participation by the researcher. Notes are made as the observation continues. Analysis and interpretation of this data is then conducted on the basis of this observation and notes are taken down.

A questionnaire is defined as "each research participant being asked to respond to the same set of questions in a pre-determined order" to understand their views and opinions on a particular topic area" (Saunders et.al, p.599). They can be part of a "survey" strategy which could be filled online (on the web using a hyperlink provided by the researcher) or offline (in person, face to face either on the street, inside an office building or at people's homes). Structured close ended questionnaires are usually analysed using a quantitiative approach (Saunders et.al, 2009). For a case study, these are semi-structured open ended questions, and their answers are analysed and interpreted through a qualitative approach.

The author of this dissertation chose "interviews" as the main data collection tool.

An interview is a purposeful discussion between two or more people (Kahn & Cannell, 1957). The use of interviews can help to gather valid and reliable data, which can be relevant to a research study. Interviews can be categorised based on the interaction between the interviewer and the interviewee (Saunders et.al, 2009). Interviews can be conducted on a one to one basis. They can be conducted through the following means: face to face, telephonic and electronic (Skype) (Saunders et al., 2009). Interviews can be also conducted on a one to many basis, that are termed as "group / focus interviews". The interviewees can also explain the significance of establishing personal contact (Saunders et.al, 2009).

There are a number of strengths that interviews offer as a data collection tool in a research study: Firstly, in depth information can be obtained; there is a greater flexbility to restructure questions especially in a semi-structured interview; personal information can be gathered; the researcher has control over the interview so that it is kept focussed on the research topic and supplementary information about the participants can be collected such as their personal characteristics and environment (Kothari, 2004). Additionally, an interview has the inherent flexibility to allow the interviewer, to pick up on points made by the participants and ask further questions (Saunders et.al 2009) and finally interviewees receive personal assurance about the way information generated through interviews will be handled (Saunders et.al. 2009).

However this data collection tool also possess some weaknesses. This can be an expensive tool when the number of participants is large and they are geographically widely spread. Certain participants such as high ranking officers are not easily approachable under this method, it is time consuming and there is also a possibility that the respondents may be putting forth imaginary information to make the interview more interesting, alive and genuine (Saunders et.al 2009).

3.9) Types of Interviews

There are three types of interviews: structured, semi-structured and unstructured (in-depth interviews) (Saunders et al., 2009). In line with Jankowicz(2005), an interview is useful if the the researcher wants a large number of questions to be answered, b) where the questions are complex and open ended and c) where the order and logic of the questions need not be in a logical order. Semi-structured and in-depth interviews are appropriate in situaitons b) and c).

3.9.1) Structured Interviews

Structured interviews use questionnaires based on a pre-determined list and a standardised or identical set of questions. The questions are exactly as they are written and the interviewer uses the same tone of voice to eliminate bias. The researcher records the responses on a standardised schedule usually with precoded answers. This type of interview is also referred to as a quantitative research interview (Saunders et.al 2009)

3.9..2) Semi-Structured Interviews

Semi-structured interviews are non standardised and often referred to as qualitative research interviews (Saunders et.al, 2009). In semi-structured interviews, there is a list of themes and questions to be covered. There is flexibility to either omit questions or change the order of questions, depending on the flow of the conversation (Saunders et.al, 2009). Additional questions may be asked to further understand the research question (Saunders et.al, 2009).

The data can be audio recorded or notes are taken down during the conversation (Saunders et al., 2009). These interviews are used to gather data, which is normally analysed qualitatively. These questions are usually a part of a case study strategy (Saunders et al., 2009). This data is used to explore and reveal "what", "how" and "why" questions. (Saunders et.al, 2009). According to research, these type of interviews are used in relation to an exploratory study as well as explanatory study (Robson, 2002).

3.9.3) Unstructured Interviews

Unstructured interviews are non- standardized and informal. They are sometime referred to as qualitative and in-depth interviews. (Saunders et.al, 2009). There is no pre-determined list of questions to work with, although it is important for a clear idea to exist, regarding what needs to be explored (Saunders et.al, 2009). The interviewee is free to talk about events, behaviours and beliefs in relation to the topic area. This type of interaction is referred to as a non directive or an "informal interview' (Saunders et al., 2009).

Both semi-structured and in-depth interviews provide an opportunity to probe into answers. Both the interviewer and the intervieww satrt understading the significance of establishing personal contact (Saunders et.al, 2009). An interview data collection technique is adopted and specifically semi-structured interviews are used to answer the research questions. One of the reasons why this approach has been adopted is due to the qualitative nature of the study and an exploratory case study approach being used.

3.10) Why other data collection methods were rejected

The study explores the barriers to innovation among Indian high and low to medium technology sectors. To further understand this, there is need for engagement in conversation at an individual level. Observations as a tool was rejected as it does not provide any human interaction and detailed responses cannot be elicted (Saunders et.al, 2009)

Focus groups are group interviews, where a group interaction occurs to discuss a provided topic area (Saunders et.al, 2009). The aim of the focus group is to gather a collective view rather than an individual view. The participants interact with each other rather than with the interviewer. The outcome of this focus group could be the culmination of individual participation views or a combination of them. Despite the advantages of focus groups, such as generating data at a low cost and obtaining multiple views, it was felt that focus groups were not appropriate as a data collection tool for this study. This is because a one on one conversation with the participants was required. The researcher was required to be in control as opposed to participants being in control (Cohen et al, 2007).

Questionnaire surveys were rejected as a data collection tool, as they provide a pre-deterined set of questions. There are limited opportunities for probing into the research question, a poor rate of return and reduced overall reliability (Saunders et.al, 2009). Furthermore, control over the questionnaire is lost once it is sent, there is inbuilt inflexibility because of difficulty of amending the questions once they are dispatched and there is the possibility of ambiguous replies or omissions to replies. These were some of the reasons why questionnaire surveys were not utilised in this study (Saunders et.al, 2009).

Telephone interviews were also rejected as a data collection tool, although they have advantages of speedy data collection at a lower cost, however it was not one of tools for collecting emiprical data. One of the reasons why they were not selected was because of lack of body language from research paricipants with no visual cues leading to problems such as building rapport and therby not getting rich responses which might invalidate the findings.

Video Skype interviews were used in this research study to collect emprical data. All the interview conversations, with the permission of the participants, were simultaneously recorded on a smartphone device using the voice recorder software.

3.11) Qualitative Data Analysis

In line with Braun & Clarke (2006 p. 79), thematic analysis is defined as "a method that strives to identify patterns of themes in the interview data". One of the advantages of this analysis is its flexbility in that it can be used for both explorative and inductive studies. Figure 1 shows a 5 step process the researcer followed in order to undertake qualitative data analysis.

Figure 1 – Diagram representing 5 steps which was undertaken for a qualitative data analysis
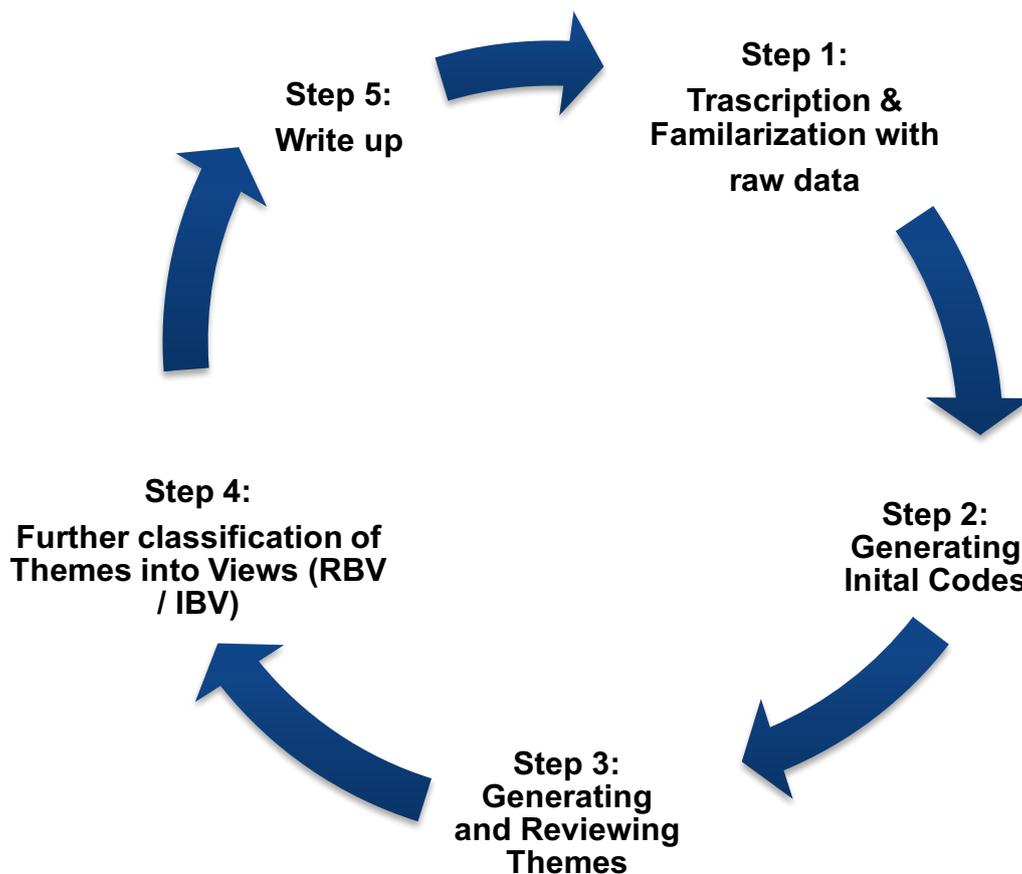
1. **Transcription & Familaization with raw data**

During the first stage all the interviews recordings which were stored on the researcher's own personal Apple Iphone, were played and transcripts were manually handwritten. These were then typed up in a word document titled Final interview Transcripts (All). The researcher printed off the word document and read through all the 9 interview transcripts without making any form of notes. This was done in order to get a feel of the data.

2. **Generating Initial Codes**

During this second stage, this printed word document was read aloud and with the help of a research partner (in this case a family member) and important words, phrases, sentences were circled in pencil.

3. **Generating & Reviewing Themes**

During this third stage all the codes identified in stage 2 were transferred into a separate piece of paper in bullet format and the researcher started classfying them into various themes. The researcher ensured that all codes identifed in phase 2 were considered and their associate themes were developd and any adjustments (if required) were made till the researcher got distinctive themes which represented the entire interiview data set.

4. **Further Classification of Themes into Views (RBV / IBV)**

During the fourth stage, all the themes identified in stage 3 were further categorised into Resource Based View and Insitution Based View (the two theoretical frameworks which is the basis of this research study) on the same piece of paper where the researcher listed the codes and started classifying the codes into themes (refer stage 3). The further cassification of themes into views developed on paper was reviewed once again with the help of a research partner (in this case a family member) and once both parties were satisifed, this were then transferred into a separate word document titled Classfiication of Themes by Views.

5. **Write up**

The researcher used this word document (produced in Stage 4) as the basis of writing up the discussion segment (section 4.3) part of the findings and discussion chapter.

3.12) Research Ethics
3.12.1) Theoretical Underpinning in Ethical Data Gathering

There are two philosophical standpoints in relation to ethics: Deontology and Teleology.

The deontology view is an approach to ethics that focusses on the rightness or wrongness of actions and that a person should always carry out their actions in a moral and responsible way. This view argues that some acts are right or wrong because of their nature and that people have a duty to act regardless of the good or bad consequences that may be produced (Mastin, 2008). This view argues that some acts are right or wrong because of their nature and that people have a duty to act regardless of the good or bad consequences that may be produced. This view is sometimes referred to as the "non-consequentialist" view, as one cannot justify an action by showing that it has produced good consequences (Mastin, 2008). This view suggests that "the end does not justify the means". In line with Saunders et.al (2009), a research following this view would never use deception to obtain research data even if deception was necessary to ensure data was valid and reliable.

On the other hand, the Telelogy view or the consequentialist view is an approach to ethics, which argues that the "rightness or wrongness of actions, is based solely on the goodness or badness of their consequences"(Regis University, 2018). In line with Saunders et.al (2009), this view argues that "end justifies the means" which means that if a goal is morally important enough, any method of achieving it is acceptable. In other words, the outcome of a consequence would decide whether the action taken in the first place was good or bad.

Based on the above two views, the researcher adopts a "deontology" view whereby the researcher carries out this research study in a moral and responsible manner. This implies that there is no intention to use deception or any false means to gather data from research participants.

3.12.2) Ethical Data Gathering

Ethical issues were considered while conducting this study. The partcipants were assured that the questions asked would not cause them stress, discomfort, pain or harm. All the correspondence sent to the prospective participants through Linkedin highlighted the fact that this interview was purely voluntary in nature and that they had the right to withdraw at any time during the research process. They were also informed that all the information gathered was purely for research purposes and that any personal data would be anonymized and kept confidential.

There were a lot of refusals from prospective partcipants in the initial stages of this research study. There were either not interested or did not have the time to undertake this. They were nevertheless conveyed gratitude for their time and effort, taken by them to read through the initial email. They were also notified that neither their rights nor their safety had been compromised.

The final respondents who agreed to participate were directly emailed using their personal email addresses to ensure quick responses. There was no pressure or coercion placed on participants to answer questions which they felt could jeoperdize their personal safety. Both parties, the research participants and the reseacher, agreed on a suitbale date and time for an video Skype interview, through whatsapp , a mobile application tool. Depending on the flow of the conversation, additional questions could be asked and probed into. Since the research participants were mainly founders and co-founders of start-ups, the researcher had to be flexible and adaptable with respect to the date and time of the interview. The researcher encouraged the particpants to ask any questions the had, whether it was before or after the interview, so that they were aware of the whole research process. At the time of the interview, there was no pressure or coercion placed on participants to answer questions which they felt could jeopardize their personal safety.

The participants had a right to decline to answer a question if they felt so. However, the researcher did not experience any such reluctance on the part of the interviewees, at any stage of the data collection process. Anything that was unclear during the course of the interview was clarified. It was also ensured that the participants were not rushed to answer the questions and to finish the interview. All interviews were recorded and completed. During the transcription of these conversations, all research participants were made annymous by assigning pseudonyms. By doing so, the confidentiality of the identity of all the research participants was guaranted.

3.13) Data Quality Issues

There were a number of data quality issues identified in relation to this research project. According to Saunders et.al (2009) there are two issues which need to be addressed. a) Reliability and b) validity which is linked with bias.

Research defines "reliability " as " the extent to which data collection techniques will yield consistent findings" (Saunders et.al, 2009 p. 600). In line with Marshall & Rossman (1999), findings derieved from a particular research project are not necessarily repeatable since they reflect reality at the time they were collected, which is subject to variability. Furthermore, it has been argued that replication by other researchers is not realistic. In line with Smith (2008), a lack of standardisation in interviews, such as semi-structured may lead to concerns about reliability. It is felt that this research study might suffer from "reliability issues". If a similar study is conducted at a different time frame, and in a different geographic area, by a different researcher, simialr results may not be generated (Saunders et.al, 2009).

The validity of a study, is the other major concern. According to Saunders et.al (2009 p.327), validity refers to the extent to which access to knowledge and experience of the participants is gained and the ability to infer accurate meanings from the responses of the participants. Validity is determined by the amount of "bias" in a study. Validity increases when study "bias" is reduced. The "interviewer bias" relates to the comments, tone of voice and non verbal body language of the researcher. The researcher may impose their own beliefs and frame of reference on the participants.

Also, the researcher can demonstrate bias in interpreting participant responses which can then lead to credibility issues. This can also lead to generation of limited or wrong information, thus raising doubts about the validity and reliability of the data. It has been stated by Saunders et.al (2009), that increased levels of validity can be achieved via three methods: clarification of the questions asked, probing into the interviewee responses and a discussion of the topic area rom various angles. Appropriate steps were taken to increase the levels of validity by engaging with the participants, using the above three methods namely: clarification of the questions asked, probing into the interviewee responses and a discussion of the topic area rom various angles. (Saunders et.al, 2009).

Secondly, "participant bias" relates to the perceptions of the research participants about the interviewer. It also is about the willingness of the research participant to engage and discuss certain sensitive themes, which the interviewer wishes to explore. The time consuming requirements of the interview process may also result in reduction of the willingness to participate in the interview. All possible and appropriate steps were taken to address the above biases (Saunders et.al 2009)

3.14) Preparation of the study

In line with research, various techniques have been put forward in relation to "preparedness" in order to overcome data quality issues. These relate to the suitablilty of the interview location; the appearance and the opening remarks of the researcher; the level of knowledge of the participants and the levels of information supplied to them, the questioning techniques employed; the behaviour, listening skills and the understanding of the researcher, data recording (including contextual data) and cultural differences between the researcher and partcipants (Saunders et.al, 2009).

Appropriate steps were taken to "prepare" the study in order to minimize data quality issues. Relevant information through whatsapp and email was provided to the participants before the commencement of the interview. This would help ensure credibility and contribute to a rich discussion between both parties. Before the interview started, appropriate opening comments were made.

The research process was explained and the consent of the participants was gained by providing a interview participation invitation letter. Participants were assured confidentiality regarding the names of the participants, organizations they belonged to and the data that was supplied. This generated ease and made the participants comfortable. The participants were thanked for their valuable time and the interview started off with "tell me about yourself" as the first question, which was standard to all.

The location of the interviews was at a distance which was convenient for both parties. Face to face interviews were not conducted, hence the appearance of either parties was of little significance. It was also ensured that all background noise was eliminated before the start of the interview and this was achieved by conducting all interviews in a quiet room. Lengthy questions were avoided and questions were framed in an easily comprehensible manner to minimize bias. Tone of voice, defined as the the way research participants communicated their answers during the research study was important for the researcher as this would enhance validity. Furthermore, the use of video skype calls as the tool to conduct semi – structured interviews with the research participants helped in eliminating bias.

Comments made by the research participants were given importance. Listenining skills were crucial while the participants expalined their point of view. Due to the nature of semi-structured interviews, at times a set pattern was not followed and questions were chosen depending on where the conversation was headed. The interview was facilitated forward, by periodically summarising answers provided by participants. The crucial aspect was addressing any curiousity and anxiety felt by the participants and ensured the maintenance of a positive relationship. The researcher did not face any noticeable "cultural differences" during the interview process as they belong to the same country as the research participants. The interview was recorded Soon after the interview, the researcher manually transcribed the entire recorded interview and entered it in a "Microsoft word" format. An excel data sheet was created to enter contextual data.

3.15) Summary of the Research Methodology Chapter

To summarise, epistemological and axiological approaches are used as the main overarching research philosophy combined with a inductive approach. The research study is exploratory in nature and has adopted a multiple case study approach to answer the 3 research questions. Qualitative semi-structured interviews have been adopted as the main data collection tool. Case study company selection section is explored further which gives the reader an overview of the process of how the researcher finally got his sample case studies. Qualitative thematic data analysis has been used to analyse the empirical data collected and the researcher has adopted a 5-step process to undertake this. Ethical data gathering techniques based on "deontology" theoretical underpinnings have been employed. Finally, best possible steps have been taken to enhance reliability and validity of the study.

The next chapter looks at the findings of the study. This chapter compares the findings generated by this research study with the findings generated from the literature review (in other contexts). This will help in understanding whether the empirical data fully support, partially support or do not support the propositions outlined in Chapter 2.

Chapter 4: Findings and Discussion

4.1) Purpose of the Findings & Discussion Chapter

This chapter presents the findings following empirical data collection from 9 Indian start-ups operating in high and low to medium technology sectors. The findings are entirely based on the interview responses from the research participants, are presented here on an individual basis.

All responses from the companies interviewed are sensitive and founders/co-founder's names and their start-ups companies are assigned pseudonyms for the purposes of confidentiality.

4.2) Results/ Findings

4.2.1) Individual Case Analysis – Company A

Company A is an innovative Indian medical device technology start-up, based in Bangalore. This start-up claims to create affordable, effective, fast and accurate medical diagnostic solutions. The product is a medical device that and aims to locate the best veins (blood vessels) for cannulation to administer drugs and draw blood for tests. Currently the company has 2 products "X" and "Y" which are non-invasive (primarily used outside the body). The start-up has 6 employees and was incorporated in the year 2011. The medical device has been commercialized in the Indian market.

Resource based View

The founder of this high technology start-up company indicated their high level of education, comprising an undergraduate and postgraduate degree as well as an MBA degree from one of the top-rated management institutions in India. They emphasised their 14 years of experience gathered by working in a vast array of start-up areas. Their social networks help identify and recruit cofounders of their current start-up company. This group together helped identify a business idea, which they seized to develop further. This indicates excellent human capital at the founder level. There is a mention of lack of internal financial resources for investment. There was lack of funding to hire skilled personnel, establish a lab or even access other labs to carry out laboratory work.

The founder replied "*You don't have access to the right lab, there is a lot of lab work to be done. And of course, being a start-up you cannot have you own lab so you must access other labs, but the fees are high and you cannot afford it. It increases the complexity*".

The founder did not have access to funding (internal) which prevented the founder from having his own laboratory. Having his own lab would have meant that he could conduct tests before launching the product in the market. This is in line with the existing studies who have stated that start-ups suffer from lack of funding due to their risky nature, low credibility and liabilities of smallness and newness. Start-up founders have no alternative but to bootstrap their ventures through personal savings, i.e. securing funds from family and friends which they cannot secure via external means (Bhide, 1998).

Institution Based View

The founder was disappointed at the poor infrastructural facilities provided by the Indian government, such as the limited availability of the number of research laboratories and the lack of skilled and knowledgeable personnel to carry out laboratory research. The formal institutions such as the Indian government did not provide funding support to small startups as opposed to start-ups that operate in an American or European environment. The ecosystem of this start-up had a high incubation period like 5 to 7 years, before its product could get launched. This in turn had an impact on external funding, which was reduced.

The founder replied "I *think the biggest problem is ecosystem. A medical technology start-up by nature has a large incubation time compared to other contemporary start-ups like Uber which are in the market within a year. Medical technology especially medical devices have an incubation period of 5-7 years. So, the people who invest in this, be it founders, investors must have this time frame in mind, unfortunately, in India, there are very few people who are ready to wait that long*".

The founder experienced "legal and regulatory barriers" (external) (part of government barriers) which prevented him from launching the medical device into the Indian market. It can be argued that the Indian government regulatory framework and its associated enforcing agencies are not good robust enough to encourage start-ups to effectively produce and commercialise their respective products in the Indian market. This is linked with the Indian political system which is characterised as unaccountable and highly corrupt (Huang, 2008) and a lack of a vibrant economic eco-system (partly controlled by the government) which caused a high incubation period defined here as the time frame between manufacturing and ultimately commercialising the innovation.

4.2.2) Individual Case Analysis – Company B

Company B is an Indian Medical device technology start-up based in Noida in New Delhi (capital state of India) which claims that it will inspire the world to be healthy and confident. It offers affordable, ultra-small and wearable health monitoring devices which ultimately aim to improve quality of life for customers. The current product is a pocket ECG card which is an ECG monitoring device which aims to reduce the chances of missing a heart attack. This product is connected to a smart-phone which has a long battery life. This device monitors stress levels, fitness levels along with the heart rate within 1 minute of holding it. The start-up has 15-20 employees and was incorporated in the year 2013. This medical device has been commercialized in the Indian market.

Resource Based View

The co-founder was an undergraduate degree holder in electronics and telecommunication from one of the best engineering institutions in India. They had several years of experience in telecom, computer science and software and had worked in several multinational companies. Along with their spouse who was also a well-qualified engineer and from inspiration provided by a personal emergency; they were both determined to devise this product. The human capital in terms of skills, knowledge and experience was superb along with their dynamic personalities. The co-founder commented on the lack of necessary internal resources and finances to develop a novel idea and to hire talented personnel.

The co-founder replied "*hiring good talent, getting funding for an idea which actually has a high cost. From idea to prototype it actually costed a lot*".

The co-founder highlighted the two most important barriers: lack of funding (internal) and lack of skilled personnel which prevented the co-founder from manufacturing and subsequently commercializing its medical device into the market. Both are crucial factors in this context.

Lack of funding: This is one of the highest-ranking barrier facing start-ups (including Indian start-ups). It can be argued that these start-ups are by nature riskier compared to already established firms and that they face liabilities of smallness and newness. In addition to this, lack of skilled personnel is also one of the second most important barriers after lack of funding. It is imperative for these start-ups that they hired skilled personnel as their R&D intensity (ratio of R&D expenditure to total sales) is above 3% thus classifying them as operating in high technology sectors (Blasco, 2008). Failure to hire skilled personnel would result in start-ups unable to commence, manufacture and commercialize their product offerings.

Institution Based View

The main challenge was to persuade the medical professionals to encourage use of this product by the public. The latter was found to be "technology resistant". The co-founder explained that people still believed in the conventional means of obtaining an ECG i.e. with wires and electrodes.

The co-founder replied "*We go very good feedback from doctors, but there were some people who were technology resistant and although they liked the product and like how we are taking ECG and displaying on smartphone, they were not convinced because they believed in the conventional means if you know doing their diagnosis. So, to bring them on the table and to convince them about the technology and validation of technology and then showing them that it is as good as the conventional machine, that was the challenge we faced*".

The co-founder experienced "cultural barriers" which prevented him from commercializing their medical device into the Indian market. The co-founder found it hard to convince the Indian masses who still believed in the conventional means of recording their ECG's through wires etc. This would also imply that the Indian masses had a low to medium preference for taking risk and didn't embrace change very easily (in this context new technology) – this is in line with existing studies (Hofstede, 2018).

Another challenge was lack of hardware development support by the government. There was also a scarcity of external funding support for the project.

The co-founder replied "***For us the biggest challenge was there is very less of hardware development support available in India. So, although we both were Electronic engineers but then we required some support on technology, so that is one thing we really faced hard***".

The co-founder also experienced "infrastructural barriers (part of government barriers). Although this study didn't find any supporting evidence on "infrastructural barriers". It can be argued that lack of government support would discourage start-ups from commencing and subsequently commercialising their innovations. Existing literature has already proven that MSME's have a great potential to contribute to the Indian economy and that governments should devise ways and means to support them KPMG, 2015). Failure to do these would result in these start-ups not surviving.

4.2.3) Individual Case Analysis – Company C

Company C is an Indian Medical device technology start-up, based in Bangalore, that focusses on child and maternal healthcare. This start-up aims to build a foetal distress monitor to address 300,000 annual perinatal deaths. Foetal distress is the result of absence of proper foetal monitoring and timely care. Perinatal deaths are deaths arising in women surrounding delivery of their babies. It is acknowledged that there are 30 million pregnancies reported annually in India and out of these, 10 million mothers require extra monitoring during labour.

The equipment needed for foetal monitoring during labour is generally not widely available and when available, the equipment is bulky and is difficult to use. Hence, there is need for widespread foetal distress monitoring equipment in India. The product X is portable, low cost, has a 24-hour battery life and most importantly, it is easy to use. This start-up currently has 6 employees and was incorporated in the year 2014. This medical device is yet to be commercialized in the Indian market.

Resource Based View

The co-founder was again highly educated and was an engineer who graduated from one of the premier institutions in India. The cofounder was resourceful, in that a group of friends got together during their university years. Together, this group, came up with an idea to improvise on an existing research based foetal distress monitoring machine, to build a low cost portable machine to detect foetal distress in a pregnant lady. They visualised that it may possibly be used on a widespread basis. This implied the existence of resourceful and talented personnel at the founding level. As per the co-founder, there was a good team of clinical and technological experts, however they had limited work experience. There was also, the need to hire the right kind of sales people with plenty of experience, to market this product locally and globally.

The co-founder replied "***We need to hire the right person to market our device India wide and look for global sales opportunities whoever that person will be, because that person will have a high experience level, because everyone here is a recent graduate with a maximum of 1-2 years of work experience. In sales, we need to find someone with lots of experience so that they can help us grow in sales"***.

The co-founder experienced "lack of skilled personnel" which prevented him from manufacturing and subsequently commercializing its respective products. This factor is considered to the second most important factor after "funding". It is imperative for these start-ups that they hire skilled personnel as their R&D intensity (ratio of R&D expenditure to total sales) is above 3% thus classifying them as operating in high technology sectors (Blasco, 2008).

Failure to hire skilled personnel would result in start-ups unable to commence, manufacture and commercialize their product offerings.

The co-founder did not have make any comments on the "funding" aspect.

Institution Based View

The co-founder viewed the main challenge to be, bringing about a change in doctor behaviour to accept this new low cost technology and to gain doctor confidence to use it. The thought is that doctors are very protocol driven, rely on their pre-existing learning, tools and devices they are familiar with and it is hard for them in general to change their working habits.

The co-founder replied "I *think one of the major problems is to do with changing the doctor behaviour, because I think the thing is something which is universal not just in India is that doctors tend to get comfortable with the stuff that they are taught. Because they are protocol driven their teaching is very protocol driven so, once they are taught to use something in a way, they find it hard to change their habits"*.

The co-founder experienced "cultural barriers" which resulted in general Indian public (especially doctors) not embracing the portal low cost medical device for foetal monitoring during labour. This would also imply that the Indian masses had a low to medium preference for taking risk and didn't embrace change very easily (in this context new technology) – this is in line with existing studies (Hofstede, 2018).

Other challenges which were brought forward related to lack of good distribution channels. The co-founder's main aim was to eliminate the middleman and directly approach the doctors to influence them to use this device. This could ensure more widespread use and thereby, a good market for this device. This would also ensure this product would get to the final customers at a reasonable price, without the price inflations that could be inflicted upon by "middlemen'.

The co-founder replied "***Most of the distribution and service channels in India are heavily influenced by middleman and they take away a large % of profit and that ends up increase cost to the customer by a margin of at least 40%. So, that is one of the things we are trying to work around. Seeing whether we can directly approach the doctors without the need to build all this network and tying up with major distributors. This will increase our interaction with the doctors and help them gain confidence in us and reduce the costs to the doctors, it makes our device much more attractive***".

The co-founder experienced "infrastructural barriers" (part of government barriers). Involvement of the middleman would reduce the attractiveness of the medical device to the end consumer (in this case doctors) both in terms of low quality and high price. This implies that there is still lack of government support. It seems that there is an urgent need for implementation of government policies which will enable the founders to directly interact with the customers without the need of a middleman.

Additionally, as a challenge, the co-founder could foresee that the start-up might face competition from another start-up which was going to introduce this same medical device product. The details of this were not revealed by the co-founder.

The co-founder replied "I ***think there is one competing company that had started development on a similar project 3-4 years ago but they never got anywhere but latest what I have heard is that because they started hearing about us, we are also coming up with a similar product they have re-started their old project looking it afresh. So, I am expecting some competition in the Indian market soon but I do not know whether it's a threat or an opportunity***".

The co-founder experienced "competition barriers" in the Indian market which would either make their product either less attractive or more attractive to the end customer (in this case doctors). This would also result in some sort of risk to his own start-up in terms of no sales and profits thereby affecting its sustainability. These are concurring with studies by Larson & Lewis (2007) who commented on competitors copying products.

4.2.4) Individual Case Analysis – Company D

Company D is an Indian food and beverage technology start-up that concentrates around the production of healthy drinks. It is the based in Bangalore, a metropolitan city in Southern India. It is the brand owner of X product and is now a market leader in the production of low calorie flavoured vitamin infused water drinks. The product boasts having no sugar and containing dietary fibres, probiotics and vitamins. The company claims that children and diabetics can consume this drink which has a wonderful taste. Its caloric content is supposed to be less than 2 calorie / 100 ml. The company was incorporated in the year 2015 and has around 5- 10 employees. The product has been commercialized in the Indian market and is currently available in 4 variants: Litchi, Guava, Mango and Orange.

Resource Based View

The founder was well qualified. They had pursued an undergraduate and postgraduate degree in agriculture from one of best institutions in India and had accumulated 12 to 13 years of corporate experience whilst working in government based start-ups. They had developed social and business networks in the market and within the investor community. The founder got in touch with a founder of another start-up, who had ample experience, in that they had already created 2 previous startups. Together, these two founders considered ideas which were explored further by conducting research. They came up with a novel idea to devise low calorie healthy drinks. The main barrier was finding the right zero calorie sweetening ingredient as an alternative for sugar, to sweeten the zero calorie drinks. After plenty of research and development, the owner could find an alternative solution- "Stevia" which would be used as a substitute for sugar without compromising the taste and quality of the drink and without the high calorie content of sugar.

The founder replied "*We had to use sweetener which would taste as a good as sugar but without the side effects of that sugar. So, that was the trickiest part. So, when we started researching that, not many options were available – whatever was available was more of a synthetic /chemical option which we never wanted to use and in the natural option, there were lots of limitations in terms of taste profile. That was the biggest challenge we had to crack and took us a lot of time and research at ground level to pass that barrier*".

The founder experienced "research and development" barriers (internal). Tremendous amount of internal research and development had to be undertaken to come up with a sweetener which would replace the side effects of sugar but tasted as good as sugar. This was a challenge for the founder at the manufacturing stage before he could even commercialize his innovation. It can be argued that this barrier is partly controlled by the government who can help start-up founders by providing access to good research facilities (labs) to conduct their research.

Institution Based View

It was interestingly found that the regulations of the Indian government were facilitative for this product. In line with the founder, there was not much financial backup or effort required to get the start-up established. The presence of online tools for this also helped. The founder was attempting to apply for external licenses to globalise this start-up, which would require compliance with national and international laws and regulations.

4.2.5) Individual Case Analysis – Company E
Company E is an Indian furniture technology start-up based in Bangalore that specialises in designing, manufacturing and selling multi-functional furniture solutions. The company offers a range of space optimizing furniture solutions which includes: X, X with Y popularly known as Z. These products aim to help their customers to optimise floor space; whether it is a master bedroom, guest bedroom, kid's bedroom etc. These products are currently used in independent homes, apartments, studio apartments and food courts. The products are currently available across India. The start-up serves 23 states and a market population of less than

1000 people. The company has around 15 employees and was incorporated in the year 2013. The products have been commercialized in the Indian market.

Resource Based View

The founder had completed their undergraduate education from a small town in Southern India. They had a wealth of experience, had worked in the United states for 8 to 9 years and then returned to their home country India to join their own family business of mining for 4 years. Again, human capital at the founder level was excellent.

Institution Based View

The founder explained that spreading awareness about the concept surrounding the product was a challenge. The concept of X was not very popular in the Indian context. The Indian masses in general had a more "traditional" view of furniture as compared to a "modernised" view. The product X was a modernised type of furniture; fewer people were aware of its advantageous aspects, such as saving of space.

The founder replied " ***The concept itself is not very popular. See when they think of a bedroom they think that there has to be a bed or cot so they don't even think that you know there is an option of X so that is our challenge. That is the problem we are even facing today that people are not looking at it, people don't know about it, so first thing for us is to educate the customer about this kind of product and then they can buy and all that, that comes secondary. So, the challenge is to make the concept popular and then sell the furniture"***.

The founder experienced "awareness" barriers. The Indian public were not aware of the concept which the founder had started thus implying a challenge for the founder at the commercialisation phase – as its products would not be generating any sales which could affect its sustainability. However, on the brighter side, the competition barrier for this start-up would be eliminated.

The founder also explained that this start-up did not have any "external competition". Thereby, this product might not get enough advertisement and that consumers might not be able to compare products of different brands. This would translate into marketing challenges for this product.

The founder replied "*the second thing is there is no huge big competitor for us. The customers can compare, like Sony makes a TV, Samsung makes a TV, easily you can compare the products and the benefits of it. So, for us there is nothing like that. First, the customer is not even aware of the product and second you know there is nothing to compare to. So, that is our challenge".*

The founder sensed that there was "no external competition" in the Indian market which would help the public in comparing similar product offerings (in this case furniture). This would imply that the founder not only faced awareness barriers but also faced no external competition – this could also imply a threat or an opportunity for the start-up founder.

4.2.6) Individual Case Analysis – Company F

Company F is a low to medium technology start-up Indian garment manufacturer and exporter of Knitwear and Hosiery garments. It is a low to medium technology start-up based in "Tirrupur", which is a city in Southern India. The company states that it strives to meet and exceed customer expectations. The organisation prides itself in minimizing environmental pollution, which could arise from the manufacturing processes conducted by them. The company claims to produce garments with the utmost care and of a good quality. The main products are categorized into Menswear, Womenswear and Kids wear. The start-up is a B2B (Business to Business) which means, its sells products to brand companies at a premium, who in turn sell these products to the consumer market. The start-up has 26 employees and was incorporated in the year 2014. All the products have been commercialized in the Indian market.

Resource Based View

The founder was a biotechnology and management graduate from a premier management institution in India. Their family business background in fabric

processing inspired them, to start a garment manufacturing business. He had experience as a trainee for a few years in this field. The founder did not indicate any issues in relation to "resources". However, they did point out that there was a need to ensure proper safety standards at the start-up premises comprising proper regulations, employee benefits and schemes etc. The examples given to back this point up, were several accidents that had taken place in the textiles industry in Bangladesh (a neighbour country to India), which had incurred widespread losses. Following these accidents, the customers of the start-up "F" had made it clear, that certain standards must be followed.

The founder replied "there **was an accident, I mean 3 years back in Bangladesh where many textile industries got damaged because of no safety regulations. Since then all customers are making it clear that all standards must be followed. So, the challenge I face in my play of work should be that all standards are established. There must be no errors".**

The founder experienced legal & regulatory barriers (internal). The founder emphasized on creating and implementing proper safety rules and regulations within the start-up organization to avoid any mishaps/accidents. This would imply safety for all stakeholders and would not only enhance the credibility of the organization but also help in the growth of the start-up.

Institution Based View

This founder who was operating in a B2B environment, had to ensure selling the products at a competitive price to the brand owners of other businesses. At the same time, the other challenge was to make profit for the start-up itself.

The founder replied "**because it a garment manufacturing business and a lead tight margin business, it is important that I must be competitive in pricing as well as having certain standards in place".**

The founder 's start-up operated in a B2B environment which required him to sell its product offerings to other brand businesses at competitive prices which is different from start-up operating in a B2C environment. The founder had to remain competitive in its prices and maintain workplace standards to enhance its start-ups credibility among the various stakeholders.

4.2.7) Individual Case Analysis – Company G

Company G is an Indian beverage technology start-up based in Hyderabad, a city in Southern India. This start-up produces packaged non-alcoholic beverages with an aim to sell them, both in India and foreign countries. The vision of this company is to sell quality products at an affordable price to its consumers. It aims to bring about a positive impact on the society. The main product is X which is basically a vitamin infused water drink which is going to be marketed in different fruity flavours. The start-up currently has 5 employees and was incorporated in the year 2016. The product is not yet commercialized in the Indian market. It was about to get launched in the market within a few months of conducting this study.

Resource Based View

The founder again was well qualified in the field of electronics and software. After having worked in a multinational company for about 2 years, they conceived this start-up. The founder had a vision to bring such a product to society, which would have positive impact. They also hoped to be able to sell it on a very large scale. The founder faced resource constraints such as lack of internal financial resources. There was little or no contribution to the funding made by family and friends. This could be a rare prospect, as the Indian mind set is usually risk averse. There must be self-interest present for someone to want to invest in such a venture.

The founder also explained the role of "family". He explained that families in an Indian context generally dissuade their members from entrepreneurship, as it can be a stressful and risky undertaking. This contrasts with a regular job employment which has social and financial security. This was something realised by the founder when they decided to quit their full-time job to go ahead and pursue their dream of

becoming an entrepreneur. Further elaborated was the viewpoint that the "family", is a resource that can also provide psychological support to the amateur entrepreneur.

The founder replied "*The second one is your family. In India, you being from India will know, if a person wants to quit his job and go for entrepreneurship or do something of his own, the entire family will pull him back. The family first pulls the person back to its roots to pursue a job or whatever else he/she wants".*

The founder experienced "psychological barriers" in terms of getting no support from his family members. It can be argued that the family's role is to provide psychologically support (considered as a resource) to the entrepreneur in pursuing his dreams (in this case self-employment). This is in line with existing research conducted by Hofstede (2018), who states that the Indian economy is still characterised by a low to medium preference for taking risks and not embracing change very easily (in this context moving from employment to self-employment).

Institution Based View

The founder could foresee external issues such as "lack of product awareness" among the public. Most of the Indian population was not aware of the health benefits of vitamins and healthy beverages. They further explained this point by pointing out to the regular customer mind set prevalent in India, such as getting attracted to eye striking and beautiful packaging and labels, rather than going for their health benefits. Also, there was the problem of such health drinks being made available only at high end grocery stores and supermarkets visited by the higher socioeconomic class of people, rather than regular shops and restaurants that are visited by the common class of people.

The founder replied *"for this product the primary obstacle will be the awareness. The awareness is not there in the Indian market so even if I put the product in the market or in a reputed supermarket people will have to choose the product based on the design, they will not choose the product based on the proposal, or its ingredients or what it is offering you.*

They will go with regular mind-set, if the label is looking good, if it is looking good it is affordable, I will go for it. The awareness is I guess 1-2% in Indian market whether you consider all kinds of ages, you take 18-25 or even 13+ or school going children they do not know what vitamin water is".

The founder experienced "awareness" barriers" among the public which included young generation whose main criteria for choosing products was fancy labels instead of health benefits. This prevented the commercialisation of their products which would negatively affect both its sales, profits and sustainability.

The founder commented that Indian culture in general is risk averse, as compared to the Western world countries like the United states which are more risk taking. Even for private investors and government to fund a start-up, there must again be significant personal interest in the product on their part. They must believe that such a business enterprise would turn out to be successful and would generate profits.

The founder replied "*the primary thing is funding, whether founder puts his own money or takes money from family or friends or even private investors, that is pretty tough in India. What I see is people/investors will never invest in a start-up idea, they need some rounds of attraction for any kind of product to reduce risk of investment which is completely different in US or western side of the world. If they like the idea, if they like the plan which the entrepreneurs are promoting they will definitely go ahead and invest in that idea".*

The founder experienced "lack of funding" (external) which prevented the founder from manufacturing and subsequently commercialising the product offering in the Indian market. It can be argued that this factor is closely related to the start-up characteristic of high risk, low credibility and liabilities of newness and smallness and that there is an urgent need for the Indian government to support these startups. (Todd & Javalgi, 207). Failure to do this would result in these start-ups not surviving.

4.2.8) Individual Case Analysis – Company H

Company H is an Indian food technology start-up based in Bangalore, a city in Southern India. The vision of the company is to provide a channel for agricultural products produced in the rural areas by farmers, to reach urban areas and wider parts of the country. Thereby, one of the other goals of this start-up, is to improve the economic well-being of the farmer community.

The start-up claims to be dedicated to enhance the health of the society and its products aim to provide nourishment and help heal the body, mind and soul. This mission of the company is to search for such foods that are organic and untainted.

All the products manufactured, use a crop called "Millet" that once used to be a staple food in India during the ancient times. The grains from this crop are now considered to be a "superfood".

Millet" grains can be harvested from dry land and there are plenty such areas in India without adequate water supply. These areas can be utilised to grow "Millet" grains. The company claims that great care has been taken to produce the Millet products in a safe and healthy environment to ensure their originality. It advocates that there is no addition of any artificial ingredients to these products. The company has around 8 employees and was incorporated in the year 2016. These products have been commercialized in the Indian market.

Resource Based View

The founder had more than 15 years of experience in the high technology sector and had run their own automation company. Although their opinion of the high technology sector was high, they thought that launching startups in the high technology sector was less practical compared to starting one in the low to medium technology sector. The founder resigned their job in the food industry in the United States, to come back to their home country India, where they created a start-up in the low to medium technology food sector. Their vision was inspired by the growing divide between the rural and urban sections of the populations; mainly the farmers suffering financial losses. The human capital hence, in terms of wisdom, experience, motivation and ideas was excellent. The founder stated that there was plenty of labour, but there was paucity of "skilled labour".

The tangible resources such as equipment were easy to procure, which indicated good internal funding. However, the problem was consolidating the equipment with the processes, which required qualified trained personnel.

Institution Based View

The founder felt that the government was not "start-up friendly". There was excessive government interference, red tape and nepotism such as the bribery of officers and people at all levels who were responsible to ensure that the product reached the customer. The corruption continued at all levels including grocery stores, who favoured shelving products of those companies that helped them make extra profit. In line with the founder, larger multinational companies could easily influence government regulations and licensing due to their massive economic resources. It would be helpful to have a "level playground" where the government could be left out of the process to help start-ups compete with such large companies. Also, it would help to make the building and sustenance process for all businesses as transparent as possible. This could include processes like provision of internet facilities for registering a company and getting the requisite licenses etc. This would basically help the founders of a start-up plan everything in advance, rather than having to implement plans stage by stage. As of the current times, there is a delay in every step to build a start-up from registering it to the marketing of the final product. These steps are the ones which are subject to governmental regulations.

The founder replied "***Number 1 is that Indian government is not industry friendly. I am trying to do something, getting people to eat healthier, people do not care, people say what is it in for me and so we have to continue to grease the system and pretty much bribe people to get things done. To have a level playing field, we need to get government out of these things, make the process as transparent as possible, get everything online, registering a company, go get your term licences, go get your factory out and be done with that. We are not looking for any government help, we are looking for less governmental interference***".

The founder experienced "excessive government interference" which made life difficult for the founder as this proved difficult in commencing his new venture, manufacturing and subsequently commercialise his product offerings. It can be argued that lack of government support to these small and growing start-ups can result in these start-ups not surviving.

The founder also cited that there is lack of good infrastructural facilities like electricity and power in small places such as those at their start-up location.

The founder replied "***there is lack of infrastructure, as much as we say we get electricity, power all those things getting it in a state of Karnataka is difficult".***

The founder experienced "lack of infrastructure" facilities (part of government barriers). Lack of these facilities would imply that the founder would be unable to commence, manufacture and subsequently commercialise its product offerings.
It can be argued that lack of government support would again discourage the start-up founders from commencing, manufacturing and commercialising their product offerings. Existing research shows the importance of these start-ups to the Indian economy and that government should devise ways and means to support them (KPMG, 2015). Failure to these would result in these start-ups not surviving.

4.2.9) Individual Case Analysis – Company I

Company I is an Indian food and beverage technology start-up based in Rajkot, a city in the state of Gujarat. Gujarat is a state in the western part of the Indian subcontinent. There are 2 start-up firms by the same company.

The first start-up is running as a food company that sells international food products "X1" and "X2", in India. This start-up is running in the health, food and beverage segment and sells its products to retail markets such as institutional markets, amazon website, through e-commerce channels etc. This start-up is scaling up its operations to multiple cities within India.

The second start-up is a health cafe serving delicacies from different parts of the world to the Indian market. The current product range includes cuisines from Mexico and Middle East. This service chain is called "Y". This is subscription based service that sells its products in restaurants as well as delivers them to customers directly. Both the start-ups have 12 employees between them and were incorporated in the year 2014. They are operating in both B2B (defined as business to business) and B2C (defined as Business to Consumer) markets. Their products have been commercialized in the Indian market.

Resource Based View

The founder had extensive work experience in the western countries, had worked in the environmental protection sector with clients in Europe and then had founded their own start-up in the United States with a friend. Later this start-up did a merger and the founder of this company "I" remains a consultant for the merger company.

The founder then started a warehouse company, providing overseas space to Indian food companies that were trying to expand internationally. This was what generated their interest in the food sector. The founder explored the idea of marketing foreign food products in India and then reviewed and conducted some case studies and online surveys. The conclusion was that this type of service would be a lucrative idea. The founder also did a lot of self-learning online and pursued appropriate courses, before starting this firm. The human capital in terms of education, experience, novelty of ideas and intelligence was excellent.

Institution Based View

One of the main barriers brought forward was the lack of product awareness amongst the Indian community regarding healthy foods and hence for the products sold by start-up "Y". There was a lot of time, effort and money required to present educative shows like roadshows, events in the malls, advertisements etc. to make the public aware of the importance of healthy foods and choices.

The founder replied *"we had to create a lot of awareness in the market, because people were not aware of the health food, like when we came out with the product and said its good and healthy, this is gonna help you and he was like*

"yeh bach kya raha hai", what is he trying to sell, we had to do sessions, it was a big learning curve for us. We did lots of events in the past 1 year, we did almost 8-9 events every 35-40 days, there is 1 event line up either at a mall or at a food event.".

The founder experienced "awareness" barriers which prevented him from commercialising its product offerings to the Indian public. To solve this issue, the founder did a lot of event sessions to popularise the product offerings and to make the public aware of healthier foods which the start-up was offering.

This would result in start-ups product offering welcomed by the public which would in turn help in boosting start-up's sales, profits and sustainability.

For products "X1" and "X2", which belong to a B2B start-up, the main problem, was to find the right distributors to market them. The distribution market in India was very disorganised compared to a western country like the United States where there are central distribution channels and the government is very supportive.

In an Indian context, there was a need for negotiation with distributors, requirement for finances to be used to find the right distributors, skills needed to contract with them and the mental strength to sometimes face losses when these distributors would fail to pay their bills and delay deliveries of the products. Also, this involved taking further steps such as discontinuing contracts and hiring alternative distributors.

The founder replied "*the issue is that the Indian market is very disorganised. You cannot find out the list of 10 distributors, find out the… unlike US where everything is organised, you manufacture a product, you work with a centralised distribution channel company. Here you have to speak with someone, negotiate with someone, paperwork doesn't matter because the Indian market is very disorganised. We went through good times and bad times, found a couple of distributors not paying their fees or are late or behind in payments, not doing deliveries in a timely manner so we had to take losses,*

take products away from them, cancel a contract find another one, so yeah first 18 months were really bad".

The founder experienced "infrastructural barriers" in terms of proper distribution channels (part of government barriers) as the founder couldn't find a list of 10 distributors – this was attributed to the fact that India is still considered to be a very disorganized place to conduct business. This in turn prevented the founder from commercializing its product offerings to the end consumer which would negatively affect its sales, profits and sustainability. It can be argued that this factor again can be attributed to lack of government support to these new and young start-ups who if not given the right support can fail.

The external funding from investors also would play a major role in expansion of the company to bigger metropolitan cities. The startups also faced competition from larger Indian companies with better networks that sold the same products and generated much bigger amounts of revenue.

The next section of this research study explores the discussion chapter.

4.3) Discussion Chapter

The purpose of this chapter is to present and discusses summary of key findings developed from the empirical data collected from 9 multiple case studies and compares proposition P1 (developed in chapter 2) with empirical data collected and ascertain whether the empirical data provides full support, partial support, or no support to proposition P1. Furthermore, the discussion chapter also aims to explore the individual cases discussed in the preceding section thematically by using RBV & IBV frameworks and specifically focusses on the "barriers".

The table below (Table 2 – summary of key findings) summarises the key findings generated from the empirical data gathered from high technology and low to medium technology sectors in the Indian context on a range of factors including "**barriers**", "**commercialisation stage**", "**human capital of founders/co-founders**", "**nature of innovations**", and "**location**". The main similarities in terms of "barriers" among the 9 Indian technology start-ups were: lack of internal finances, lack of skilled

personnel, poor infrastructure facilities, lack of government support, lack of good distribution channels and external competition. This provides partial support to propositions P1 (see literature review chapter). One of the surprising findings of the research study was the role of "psychological barriers" discussed by only 1 founder whose industry was operating in the "low to medium technology" sector.

The researcher did not expect "psychological barriers" factor to be applicable in only low to medium technology sectors as founders/co-founders commencing their start-ups in either of the sectors would face family resistance thus psychologically discouraging them from starting and sustaining their business.

Start-ups in both sectors had either commercialised their products in the Indian market or they were in the process of commercialising them in the Indian market. The researcher argues that this delay could have been due to the barriers which the founders/co-founders faced. The barriers could be both resource (internal to the organisation) and institutional based (external to the organisation).

With regards to human capital of the founders/co-founders, both sectors had good levels of education however differed in their work experience. Founders/co-founders had plenty as well as limited work experience and this trend was observed in both sectors (high and low to medium technology).

Start-ups in both sectors were either involved in radical and/or incremental innovations before they finally commercialised their products in the Indian market. This research study argues that importance of innovations (either radical (defined as revolutionary original product) and/or incremental (small improvements to existing products)) in today's world is magnified for the following reasons: increased global completion, decreased product lifecycles and changing consumer demands concurring with studies by Gujarro et.al (2009).

Finally, in terms of location, although majority of the technology start-ups were based in Southern India (especially Bangalore) which is named as the "Silicon Valley of India", however it was noted that one start-up from each sector (high and low to medium technology) were based in Northern and Western parts of India.

Table 2 – Summary of key Findings

Factors	High Technology Sectors	Low to Medium Technology Sectors
Barriers	RBV: Lack of internal finances, lack of skilled personnel. IBV: Poor infrastructural facilities, lack of external funding, lack of government support, dealing with an ecosystem which has a large incubation period, dealing with technology resistant people, lack of hardware development support, challenge of dealing with inflexible doctor behaviour, lack of good distribution channels, and external competition.	RBV: Limited internal R&D support, lack of proper safety standards at premises, lack of internal finances, lack of family support and lack of skilled personnel. IBV: lack of product awareness, struggle to sell at competitive prices, role of national culture, lack of government support, poor infrastructural facilities, lack of good distribution channels and external competition.
Commercialization stage	Companies A & B had already commercialized their product; Company C had not yet commercialized its innovation.	Companies D, E, F, H & I had commercialized their innovation, whereas company G had not yet commercialized its innovation
Human Capital of founders/co-founders	Founders operating in high technology sectors had a good level of education. Founders of companies A & B had plenty of work experience whereas founder of company C had limited work experience	Founders operating in low to medium technology sectors had a good level of education. Founders of companies D, E, H, I had plenty of work experience whereas founder of company's F & G had limited work experience
Nature of Innovations	Companies B, C strived for incremental innovation whereas Company A strived for radical innovation	Companies F, G, H, I strived for incremental whereas Company D & E strived for radical innovation.

Location	Companies A, B, & C were mainly found in Southern and Northern parts of India	Companies D, E, F, G, H & I was mainly found in Southern & Western part of India

The next section will be used to discuss the 9 case studies holistically using RBV & IBV theoretical frameworks developed in the literature review chapter (see chapter 2)

4.4) Resource Based View
4.4.1) Financial Barriers

Lack of funding is considered one of the top barriers in the field of "entrepreneurship" – this is in line with existing literature (Bhide, 1998) who argued that 95% of the start-ups bootstrap their ventures through personal savings and social networks which mainly comprises of friends and family and only 5% of the start-ups secure venture capital backup which is surprising. One of the reasons why this phenomenon may occur is due to nature of start-ups which are inherently risker.

Lack of internal finances was one of the top barriers for several companies interviewed, concurring with studies by Blasco et.al (2008), Jaroswalski & Saberwal (2013), Larson & Lewis (2007), Reazie et.al (2012), Xie et.al (2010) and Bozh & Rajh (2016). Whether considering "start-ups operating in high technology" sectors such as Company A & B or "start-ups operating in low to medium technology sectors" such as Company G, a lack of funds was a barrier to their development. Company G revealed the reluctance of family and friends to invest money as they did not want to undertake any monetary risks. Given that 95% of start-ups bootstrap their ventures through personal savings or those of family and friends Bhide (1998), Company G endured significant problems in this regard. Lack of financial resources translates not only in the inability to purchase basic equipment, but also in the inability to hire and pay skilled labour. This labour can potentially develop a new idea and consolidate whole processes, including the marketing of the final product. For instance, company A (operating in high technology sector) did not have the resources to establish a laboratory nor the finances to access other labs to carry out research work.

4.4.2) Competence Barriers

"Lack of skilled personnel" (closely linked with work experience) is also an important barrier after "funding". Lack of skilled personnel was the second most important barrier for several companies. These included Companies A, B, C (operating in high technology sectors) and Company H (operating in low to medium technology sectors. It is argued that start-ups operating in high technology sectors (comprising of medium to high technology and high technology) have high levels of R&D intensity (3% and above) which justifies the need for hiring "skilled personnel" whereas in the case of low to medium technology industry (comprising of medium to low technology and low technology) the levels of R&D intensity is very low (between 0 - 3%), therefore it can be argued that the need for skilled personnel is not so high (Hirsch-Kriensen et.al (2008).

4.4.3) Research & Development Barriers (Internal)

There was lack of adequate research facilities, due to internal financial and accessibility constraints again concurring with studies by Blasco et.al (2008), Jaroswalski & Saberwal (2013), Larson & Lewis (2007), Reazie et.al (2012), Xie et.al (2010) and Bozh & Rajh (2016). Lack of skilled personnel was also an impediment in developing an idea further concurring with studies by Blasco et.al (2008), Jaroswalski & Saberwal (2013), Larson & Lewis (2007), Reazie (2012), Xie (2010) & Saberwal (2013). Company D (operating in low to medium technology sectors) found its final zero calorie sweetener, called "Stevia" by carrying out a tremendous amount of internal research. The research study did not find any existing literature on this factor.

4.4.4) Legal & Regulatory Barriers (Internal)

Company F (operating in low to medium technology sector) emphasized the importance of devising and implementing appropriate rules and regulations within the start-up organization. Lack of these, could a barrier in the financial progress of the firm. The research study did not find any existing literature on this factor.

4.4.5) Psychological Barriers

The founder of company G (operating in the low to medium technology sector) indicated the role played by the family of the entrepreneur. Lack of support from the family (family resistance) can psychologically discourage the entrepreneur from starting and sustaining his/her business. The researcher also notes that this was also one of the surprising findings which came out of the empirical data. The researcher did not find any existing literature on this factor.

4.5) Institution Based View

4.5.1) Government barriers

4.5.1.1 Legal & Regulatory barriers (External)

The absence of proper regulatory frameworks provided by the Indian government, was cited to be a major external barrier for the build-up, sustenance and progress of these companies concurring with studies by Farsi & Toghraee (2014) and Bozic & Rajh (2016).

The regulations surrounding the production, marketing and utilisation of products were weak, as experienced by Company A (operating in high technology sector). The founder of Company H (operating in low to medium technology sector) found corruption to percolate through all levels of the government, down to the market level such as grocery stores. The founder of Company I (operating in low to medium technology sector) mentioned the corruption of government officers, the absence of online tools for registering and obtaining licenses for a company and biased government regulations favouring larger companies to be a barrier which was in line with the responses of Company H. This is in line with a study conducted by Huang (2008) which confirms that the Indian political system is characterised by unaccountability and excessive corruption. There was also a lack of vibrant economic ecosystem, which caused a high incubation period, as experienced by company A (high technology start-up). The researcher did not find any supporting evidence in the literature.

4.5.1.2 Financial Barriers (External)

The Indian government it seems did not provide enough funding support to these start-ups, as experienced by the founders of Companies A & B (operating in high technology sector). The importance of this factor has already been explained (see section 4.5.1). Furthermore, lack of funding (internal and/or external) hampers not only the start-up phase but also expansion and internationalization (Todd & Javalgi, 2007). It could be argued that as these entrepreneurial firms grow and flourish, their external funding might increase, as investors might feel greater confidence in them (Todd & Javalgi, 2007).

4.5.1.3 Infrastructural Barriers (including lack of proper distribution channels)

Company A (operating in high technology sector) found the absence of infrastructural facilities such as research labs to be a barrier. Lack of infrastructural facilities like electricity and power were found to be a barrier in Bangalore, where company H (low to medium technology start-up) was located concurring with studies by Reazie (2012). Company B (operating in high technology sector) also experienced lack of hardware development support. This research study did not find any existing literature on this factor.

There was concern from one of the founders regarding lack of good distribution channels in the Indian setup, as opposed to the streamlined centralised distribution channels provided by governments of developed countries such as the United States as voiced by the founder of company I, a low to medium technology start-up. This founder had enjoyed a good experience with building his own start-up in the United states. Furthermore, Company C (operating in the high technology sector) found the existence of "middlemen", employed to get the products delivered to the customers, to be another barrier. Middlemen could reduce the importance of the final product and cause it to reach the customer at a higher price.

The time, effort and money spent in negotiating and contracting with distributors on a private level, was a major barrier faced by Company I (operating in low to medium technology sector). This research study did not find any supporting evidence on the above factors. From the above discussion, it can be inferred that much of the problems faced by these Indian technology entrepreneurs stems from the lack of "government support" (this can be defined as supporting startups in the form of providing financial, regulatory and infrastructure support which will aid them in successfully commencing their new ventures and commercializing their respective innovative products). This is in line with studies conducted by Saberwal (2013) Naidu et.al, (1997).

4.5.2) Cultural Barriers

Company B (operating in high technology sector), found the public to be resistant to change, in the use of new technology. It still believed in conventional ways of medicine. Furthermore, Company C (operating in high technology sector) viewed the main challenge to be, to bring about a change doctor behaviour to accept a new low cost technology. The start-up found it difficult to gain doctor confidence.

The Indian population was found to be reluctant to undertake risks and viewed the security generated from a regular employment to be more valuable. This was experienced by the founder of Company G (operating in low to medium technology sector). The founder also found this risk averse behaviour to exist among private investors and the government likewise. This finding is in line with research study conducted by Hofstede (2018) who concluded that India as an economy has a medium to low preference for uncertainty such as taking risks and attitudes to change.

4.5.3) Awareness Barriers

The founder of Company E (operating in low to medium technology sector) encountered lack of public awareness regarding the company product. Since, there were no other products in the market of a similar nature, there was also not much advertisement of this product. This in turn posed marketing challenges for the company. The research study did not find any supporting evidence in this existing literature.

However, on the brighter side, the competition barrier for this start-up was eliminated. It was discovered that the Indian population was not aware of the health benefits of certain foods and only opted for those products (irrespective of health benefits) which carried with them fancy labels. This barrier was faced by Companies G and I (operating in the low to medium technology sector), which belonged to the food and beverage industry. Again, the researcher did not find any supporting evidence on this factor.

4.5.4) Competition Barriers

The co-founder of Company C (operating in the high technology sector), predicted competition by a similar start-up, concurring with studies by Larson & Lewis (2007). In a B2B environment, Company F (operating in the low to medium technology sector) strived to sell its product at a competitive price to other brand business in India. Company I (operating in low to medium technology sector) claimed to face competition from larger companies with better resources which were selling the same products.

The next section of this research study provides a summary of the findings and discussion chapter.

4.6) Summary of Findings & Discussion Chapter

To summarise, the findings chapter presented 9 case studies on an individual basis using 2 theoretical frameworks (RBV & IBV). Moving on, the discussion chapter presented and discussed the summary of key findings (refer table 2). The findings provide partial support to proposition P1, highlighted in the literature review chapter (see chapter 2). Furthermore, the researcher also found one surprising finding which was "psychological barriers" only mentioned by 1 founder operating in low to medium technology sectors. Moving on, the discussion chapter explored these 9 case studies holistically using the same theoretical frameworks and focussed on the "barriers" factor.

The next chapter provides the conclusions of the overall study.

Chapter 5 - Conclusion
5.1) Purpose of the Conclusions Chapter

The purpose of this chapter is to present the conclusions of this research study.

5.2) Conclusions

The aim of this research study was to investigate barriers to innovation among Indian start-ups operating in high and low to medium technology sectors as well as to explore any similarities and differences in barriers among them. Also, it aimed to find out if there were any other factors which differentiate Indian start-ups in high technology from Indian start-ups operating in low to medium technology sectors.

This study utilised two strategic management frameworks, namely the Resource Based View, and the Institution Based View to address the three research questions. The RBV & IBV frameworks were used throughout this research study and facilitated in successfully answering the 3 research questions.

The barriers similar to both the Indian high technology and low to medium technology startups, comprised lack of government support encompassing poor infrastructural facilities such as research laboratories and lack of good distribution channels. Further concerns were a paucity of skilled personnel, limited internal funding and external competition. Unique to the low to medium technology sector were barriers such as lack of proper safety standards at the start-up premises, absence of psychological and financial support from family, lack of product awareness and limited health education of the masses. The barriers were also some elements of national culture and society and there were additional challenges with regards to expansion and internationalization of the low to medium technology start-ups.

It seems like the Indian technology start-ups were rich in their human capital in terms of experience, education, skills, resourcefulness, talent, ideas, vision and motivation at the founder and co-founder level. As an observation, founders/co-founders had excellent education levels however some founders/co-founders had plenty of work experience whereas some founders had limited work experience and this trend was observed in both sectors (high technology and low to medium technology)

The founders had novel ideas, they were inspired to develop products and services which would have a positive impact on society. Their underpinning concerns related to environmental health, general population well-being and financial stability of all classes of society. They basically wanted to make affordable, high quality products which was accessible and available to the public.

In general, the high technology startups were founded mainly in Southern (Bangalore which is termed as the Silicon Valley of India) and Northern parts of India whereas the low to medium technology startups were mainly found in Southern and Western parts of India.

All the 9 Indian technology start-ups operating in high and low to medium technology sectors dealt with product innovations. All the Indian technology start-ups operating in high and low to medium technology sectors attempted both incremental and radical innovations. This research study argues that importance of innovations (either radical (defined as revolutionary original product) and/or incremental (small improvements to existing products)) in today's world is magnified for the following reasons: increased global completion, decreased product lifecycles and changing consumer demands concurring with studies by Gujarro et.al (2009).

Some new barriers were discovered upon completion of the primary research which were not part of the literature review: these were: research and development (internal) barriers, legal and regulatory barriers (internal), psychological barriers, cultural barriers and awareness barriers and government support (infrastructure barriers). Conversely some barriers which were reviewed as part of the literature which were not found upon completion of primary research: these include market and organizational barriers. The findings provide partial support to the proposition P1 that was put forward in the literature review chapter - P1) Lack of funding (internal and external funding), lack of information on technology and markets, inability to find suitable partners, saturated target market, lack of skilled personnel, high staff turnover, lack of technical experts, lack of proper national policy and regulatory environment, lack of knowledge on new product development process, competitors copying products.

One of the surprising findings which came from the interviews conducted as part of the primary research was the role of "psychological barriers" discussed by only 1 founder whose industry was operating in the "low to medium technology" sector. The researcher did not expect "psychological barriers" factor to be applicable in only low to medium technology sectors. This study argues that founders/co-founders commencing their start-ups in either of the sectors would face family resistance thus psychologically discouraging them from starting and sustaining their respective businesses.

To conclude, this research study showed that Indian start-ups are small and faced multiple barriers. Therefore, it is important for the home government to actively support these technology start-ups. The Indian start-ups, face problems not only experienced by start-ups elsewhere but also faced challenges unique to their home country.

The next chapter looks at the limitation of this study and explores fruitful future research avenues.

Chapter 6 – Research Limitations and Future Research

6.1) Purpose of the Research Limitations and Future Research Chapter

The purpose of this chapter is to outline the limitations of this study. The first section outlines the research limitations and the next section provides the future research avenues.

6.2) Research Limitations

This research study suffers from the following limitation which was beyond the control of the researcher.

Firstly, qualitative case studies incorporated were limited to only 9 Indian technology start-ups operating in both high and low to medium technology sectors. The results drawn from this study may or may not be applicable to other high and low to medium technology sectors operating in the Indian start-up context. Secondly, this research study did not utilise any computerised software package such as Nvivo to collect, organise and analyse qualitative interview data gathered from research participants. The researcher believes that findings of this study could have been different had this research study utilised a computerised software package.

The next section aims to provide some potential future research avenues for researchers interested in the topic area of technology entrepreneurship.

6.3) Future Research Avenues

Researchers and scholars interested in the field of technology entrepreneurship could pursue the following future research avenues which this dissertation did not consider.

Firstly, a similar research study among Indian start-ups operating in high and low to medium technology sectors can be conducted by addressing the above research limitation. It would be useful to compare the results of these two studies. Secondly, another research study within the Indian startups (operating in high and low to medium technology sectors) and evaluate firm performance (both financial and non-financial) after the elimination of the barriers highlighted in this study. Thirdly, the role of "psychological barriers" in the Indian start-up context especially within the high technology sectors can be explored. Finally, another research study in the Indian start-up context can be conducted on the theme of "barriers to innovation" by focussing on 1 industry from the "high technology sector" and 1 industry from the "low to medium technology sector".

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Appendices

Appendix 1: Interview Transcripts

Interview Transcripts – Founder A, Company A

Interviewer: Hello

Interviewee: Hello

Interviewer: Hello Founder A

Interviewee: Yes, Saurabh

Interviewer: Hi Founder A. How are you?

Interviewee: I am good. How are you?

Interviewer: I am good.

Interviewee: Finally

Interviewer: Yes...Are... I hope you read my email which I had sent you earlier with regards to my project

Interviewee: The earlier one. Yes. I did read. You are basically doing some research on the factors contributing to the success of start-ups.

Interviewer: Yes, I am looking into barriers to innovation among Indian medical technology start-ups and I have got questions which will help me understand my research topic in more detail. So, hence the reason I am contacting founders/co-founders in this regard.

Interviewee: Sure.

Interviewer: So, I want to say the interview won't last more than 30 minutes and stop me for any clarification or anything.

Interviewee: Right

Interviewer: So, I will get down with the questions. So, before I start, can I ask the incorporation date of Company A?

Interviewee: The Company was formed in 2011

Interviewer: What was the month?

Interviewee: March

Interviewer: March 2011

Interviewer: You already mentioned you have 6 employees within your company

Interviewee: Yes

Interviewer: Ok. That is fine. So, can you tell me more about yourself?

Interviewee: Myself. So, I did my Btech way back in 97 from Engineering College, Bhopal in Electronics and communications and followed by that I did Masters in signal processing which is a branch of Electronics and communications in 99 in Bangalore. In 2006-2009 I did my MBA from IIM Bangalore. Following my masters in 99, I have been working with various companies most of them being start-ups. I have worked in companies you wouldn't have heard so let's skip the names but I have worked across domains from satellite communications to sport broadcasting and now I am in healthcare. Around 2010 we were although I was not new to start-ups there was a little bit inertia that we should do something of our own – me and my co-founders were discussing ideas, were being thrown around and then we kind of heard about this problem being getting attention – so we decided let's try it and that how we jumped into this.

Interviewer: Ok. So, I was going through your website yesterday and I learn that you have two Medical Devices – A & B. Am I correct. Are these in the Indian market right now?

Interviewee: They are in the Indian market now. We have just started shipping about a month back. So, they are in the market but they haven't penetrated so to say.

Interviewer: Ok. So, they are still not in the Indian market. Is that what you are saying?

Interviewee: They have started. So, like they are in the market but not yet penetrated has not yet started.

Interviewer: Ok. So, as a founder what problems did you face in bringing both your medical devices into the Indian market.

Interviewee: Ok. I understand your study is specific to the Indian scenario.

Interviewer: Yes. I am considering the Indian medical start-ups and I am specifically considering the Indian medical devices sector. So, medical technology is a varied sector. It includes pharmaceutical, biotechnology, medical devices and diagnostics. My specific focus is medical devices and diagnostics in the Indian market. So, the question. Medical devices and what problems do founder face.

Interviewee: Got it. So, going back to the question, what problems did we face as a medical technology start-up? I think the biggest problem is eco-system. A medical technology start-up by nature have a large incubation time compared to other contemporary start-ups like Uber which are in the market within a year. Medical technology especially medical devices have an incubation time of 5-7 years.

So, the people who invest in this be in founders, investors, VC's must have this time frame in mind, unfortunately Indian there are very few people who are ready to wait that long. So even if the government (now days it says we want to encourage and all but it has not come to the ground yet. The government is not willing to support to support this kind of projects.

So, that is a biggest problem and that manifests into many issues since you don't have resources, the funding you are not able to hire the right resources, you don't have access to the right labs, there is lot of lab work to be done. And of course, being a start-up you cannot have your own lab so you must access other labs, but the fees are high you cannot afford it. It increases the complexity. That was the biggest thing. Second is probably the manifestation of the same thing – there is lack of good resources, infrastructure for medical technology in India specifically. There aren't too many labs if I have to do trials, there are, nobody is clear how to do trials, only a few hospitals like AIIMS, they are located in 1 or 2 locations in India.

Interviewer: I want to clarify when you say large incubation time of 5-7 years, what exactly do you mean by that.

Interviewee: So, if you take. I am sure you know about Uber.

Interviewer: Yes

Interviewee: If I have to do Uber today, I can very well guarantee that in a year or two my product will be in the market and I will be making revenue – however big or small. Right in medical, especially medical devices the time to the market is very long – its 5-7 years. Mainly because you aren't dealing not just apps you are dealing with concrete products – the devices touching humans. So, you have to be careful. Uber can make 1 mistake, 1 route here or there. Ok. Instead of charging 100 rupees you are charging 150 rupees. Here you cannot have that leeway. You have to make sure what you are doing, so you have to be careful, have to do extra R&D, extra trials, and then there are lots of regulations in place. So, you have to get those certifications, clear those regulations.

Interviewer: Do you think government regulations have been an issue for your company

Interviewee: Do you mean regulations relating to medical devices

Interviewer: Yes

Interviewee: They have been but not I wouldn't say that became swift offers for us till now. There are lots of regulations which affect start-ups in India but here we are

talking about medical devices. Other regulations in general do affect. The primary reason regulations in India haven't affected us is that there are still weak. The enforcement agencies aren't up to the task. So, there are some regulations which are nowhere as stringent as European regulations even whatever agencies are there to enforce them are lackluster.

Interviewer: It's quite weak. I mean when it comes to regulations India is quite weak in this front

Interviewee: Right now, it's catching up. There is a move. I think in the coming years or so we will have better regulations.

Interviewer: That's great. It gives you an insight how internal and external factors can affect a company like yourself. One thing is you start a company and the other thing is making it a success especially when you have so many issues like regulations, infrastructure, and regulations.

Interviewer: Ok. That was my last question. These were the main questions I had in mind. Thank you for answering these. Do you have any questions for me at this point in time?

Interviewee: Nothing specific

Interviewer: Ok. So, thanks once again for helping me this morning. Good bye

Interviewee: Good bye.

Interview Transcripts – Co-Founder B, Company B

Interviewee: We got to talk to each other. Shoot your questions

Interviewer: I am thankful that you have given me your valuable time because it's difficult to get in touch with founders/co-founders and have this conversation

Interviewee: No issues.

Interviewer: Like I said the interview won't last more than 30 minutes and it depends on how much time you give to a question. So, it depends on your responses. So, I will start off with the questions. So, can you tell me more about yourself?

Interviewee: Yeah. Sure. I am an Electronics and Telecommunications Engineer and as most of our people do on completion of my graduation, I joined an IT company and moved into IT communication field completely. I left my telecom education and I moved into IT completely I was working, I worked in various MNC's. So, my last MNC I was working in is a Computer Science corporation and I was considering different technologies, software development mostly into software as a service.

Mostly into Insurance domains and healthcare domain. I was looking after a team which was located in two geographies one is Indian and one is Australia and I was towards the end when I left my job, I was mostly into quality analysis and strategizing so and so stuff. My husband Mr X who is our founder he is again an Electronics and Telecommunications Engineer and he was mostly into electronics domain – he was making mobile phones and you know deciding features. His last company was Company X. He was taking care of a team of 200 people divided into 3 geographies mostly into Latin America. I mean the business area was Latin America and so this is our background.

We were happy in our jobs 8 years into our jobs and suddenly a personal emergency striked. We were actually, we used to do lots of stuff like lots of freelance software development, hardware development for different clients. We used to do that along with our jobs. But we never thought of starting a company and moving into it full time. A personal emergency struck. Mr X's father was diagnosed with a cardiac condition and he was not knowing it while. A general check-up. He was admitted and found to be sitting on a massive heart attack. This actually scared us and we actually thought at that time where technology is touching everything, how come smart phones were getting popular at that time- I am talking about 2012. We thought that how come there is nothing integrated to the Smartphone, no device, no gadget that can actually send, alert a person who is having a chest pain or something and tell him whether it is something serious or more generic like gastric pain, muscular pain or thing like that. So, we researched and we found that there is no such device available. The maximum we could search for was a 1-2 lakh device which is a holter device – which should we worn around and records your ECG for 24 hours but there is nothing where you can take ECG on demand and share the report instantly and get it reviewed and you know alert instantly. So, we both being Electronic Engineers and having a.... for doing something new. We setup a lab and started working on making a circuit which is sensor based and which was integrated with a Smartphone and finally we came up with a prototype in 2013. You know which was a very small match box kind of a system. The ECG is taken by just touching your thumb and ECG was displayed on the mobile phone. So, this is how our first prototype came along and then we showcased on different platforms and then we got various feedback from doctors and user community and both of them told us that you know this is a very useful device for both doctors and users/patients. The doctors can provide better

care and management of patients and users can keep this device and you know get an instant alert in case of any emergency strikes. So, this is how we started Company B and we thought of commercializing it and making into a complete product and then you know we move ahead in that direction.

Interviewee: Hello

Interviewer: I think the call dropped. I was going through your company yesterday and read about the medical device product which you have – Medical Device B. So is this medical device in the Indian market right now

Interviewee: Yes... Its available on Amazon, Flipkart on sale. So, it is being sold retail and are selling it to institutions like government, public healthcare schemes where you know such pocket device an actually be of real help. So, it is in Indian market and being adopted very fast and with open arms.

Interviewer: So, as I will be referring to you as the co-founder so as a co-founder what problems did you face in bringing the medical device to the market

Interviewee: So, I would tell you form a perspective, as we are based in India – maybe a person based in US or Singapore might be having different perspectives. For us the biggest challenge was there is very less of hardware development support available in India. So, although we both were Electronic Engineers but then we required some support on technology, so that is one thing we really faced hard. Silence..... Fund the project yourself initially.... silence

Interviewer: You mentioned about hardware development support

Interviewee: Yes, so... silence... Other biggest issue that we faced was you know. We got very good feedback from doctors, but there were some people who were technology resistant and although they liked the product and like how we are taking ECG and displaying on smart phone – they were not convinced, because they believed in the conventional means if you know doing their diagnosis. So, to bring them on the table and to convince them about the technology and validation of technology and then showing them that it is as good as the conventional machine that was the challenge we faced

Interviewer: So, doctors were resistant

Interviewee: Yes

Interviewer: Anything else which you feel was a problem

Interviewee: Apart from that everything was a problem. Hiring good talent, getting funding for an idea which actually has a high cost. From idea to prototype it actually

costed a lot. So, those were challenges, we both were working full time in this. So, these are the basic challenges we faced.

Interviewer: Ok.

Interviewee: Yes

Interviewer: Ok. I think you have answered all my questions.

Interviewee Great:

Interviewer: I wanted to know if you have any questions for me at this moment in time.

Interviewee: So, I wanted to know the topic of your research and what you are doing and what difference would it make to our start-ups like us.

Interviewer: So yes. My research topic is "Technology Entrepreneurship". I have completed my literature review. So, my. Line goes off. The interviewee advised that she had to rush for an urgent meeting.

Interview Transcripts – Founder C, Company C

Interviewer: Hello. Founder I. How are you?

Interviewee: I am doing fine.

Interviewer: Are you happy to start with the interview

Interviewee: Yes. Sure. I am fine.

Interviewer: Can I just start with the main questions if that is ok with you.

Interviewee: Yes, Sure. That is fine.

Interviewer: So, can you tell me more about yourself?

Interviewee: Yes. Hi. I am Founder I. I am a co-founder at Company I. We are developing a fetal heart monitor based on ECG technology to improve upon the current standard of care which is the non-stress test machine.

Interviewer: Ok

Interviewee: Is that enough or you want me to go into further details

Interviewer: Yes. I mean I was more into your prior education and work experience.

Interviewee: Ok. So, I am a grad from one of the premier institutes of India which is BITS Pillani. I did my Electronic and Communications Engineering from there. I started this company whilst I was still in college. I was in my 3rd year. Basically, we friends got together and decided that we weren't really interested in pursuing corporate jobs. Wanted to do something of our own. Something interesting and where we could use the skills we learnt in college. So, we decided on the medical

domain field and we knew we wanted to do something in medical technology. One of my friends, his parents are doctors- he stumbled on this machine for monitoring the fetal heart rate during labour which is called the non-stress test machine and then they were not really happy with it. We had a look at the technology and we did lot of preliminary research as to what other possibilities exist, what other options are for fetal monitoring. We came upon a solution which we thought was really interesting and it was only being used at very high end niche places and mainly for research purposes and we thought we could convert that technology into something more affordable and can be used widely.

Interviewer: That's a very good answer to my question. So, you have had prior work experience before stumbling onto coming up with this company

Interviewee: No. No. The only experience I had was 2 months' summer internship that I did in an Electric Motor Manufacturing Company. That much and hearing stories from my seniors and just basic process of placements which everyone was going through gave us the decent idea that ok... this is something we are not really interested in. We do not want to go into the standard IT consultancy or 9-5 job. We wanted to go into somewhere we can do a lot of problem solving day in day out.

Interviewer: Ok.

Interviewee: and tackle new challenges. That's why I started this while I was still at college. I have no experience working in an office.

Interviewer: My next question relates to the medical device which you have Medical Devices

Interviewee: The interviewee interjected as I was not pronouncing the name of the medical device correctly and explained the meaning of the term.

Interviewer: I am so sorry. Is this medical device in the Indian market right now?

Interviewee: No. it's not in the market, by the next 3-months we will be doing a pilot launch with around 50-200 devices with our partner hospitals and based on their feedback and you know the market responses we get, in the first quarter next year we will be going for a full-scale launch.

Interviewer: Ok. So, I wanted to know what problems do you foresee if you were to bring this medical device into the Indian market.

Interviewee: I think one of the major problems I talked about last time (had an interview but did not record the responses) with was that changing the doctor behaviour, because I think the thing is something which is universal not just in India,

is that doctors tend to get comfortable with the stuff that they are taught. Because they are protocol driven, their teaching is very protocol driven so, once they are taught to use something in a particular way, they find it very hard to change their habits. When we want to change from Non-Stress Test device to our device even though we want to keep the doctor behaviour change to a minimum there is still sort of adjustments and any new technology that you bring in is always met with skepticism. A non-invasive fetal ECG at this cost which is very user friendly, obviously, people will be skeptical about it. I think building up the confidence and getting enough devices out and generating the buzz and confidence levels in doctors to go and start using the devices – that is the major challenge for the India market.

Interviewer: Anything else.

Interviewee: Apart from that, in terms of the market also issues with. So even if doctors are ready to buy the device getting to them is not as simple and straight forward. Because you need to have a good distribution network and also a servicing network so that you can support the device once it is out in the market, field. Most of the distribution and service channels in India are heavily influenced by middleman and they take away a large % of your profits and that ends up increase cost to the customer by a margin of at least 40%. So, that is actually one of the things we are trying to work around. Seeing whether we can directly approach the doctors without the need to build all this network and tying up with major distributors that will one increase our interaction with the doctors and help them gain more confidence on us and reduce the cost to the doctors, it makes our device much more attractive.

Interviewer: That is true. You are eliminating the middleman and directly.

Interviewee: Yes. We are working on ways in which we can do that. I do not think we have a viable solution as yet. E-Commerce seems to be a sort of attractive but what we have yet to validate is whether a doctor will be happy to buy a medical device that he intends to use it on patients online, whether he trusts the device and he can buy it online. So, that is something we need to validate.

Interviewer: Ok. Do you think there are any internal/external problems which might be a problem for your company?

Interviewee: In terms of market. So, internal problems, not a problem per se. I would say that we need to hire the right kind of people because we haven't started sales yet, we do not have sales people yet, mainly technical and clinical in our team right now. So, we need to hire the right person to market our device India wide and also

look for global sales opportunities whoever that person will be, because that person be of a very high experience level, because everyone here is a recent graduate with a maximum of 1-2 years of work experience. So, it's a very young team. In sales, we need to find someone with lots of experience so that they can help us grow in sales. In terms of external factors, I think there is one competing company that had started development on a similar project 3-4 years ago but they never got anywhere but latest what I have heard is that because they started hearing about us, we are also coming up with a similar product they have re-started their old project looking it afresh. So, I am expecting some competition in the Indian market soon but I do not know whether it's a threat or an opportunity because the more people there are out advertising about fetal ECG monitoring over non-stress test monitoring the readier the doctor community will be to adopt ECG monitoring. I think that is a good thing and a bad thing for us. So, we are happy.

Interviewer: I think that was my last question. So, do you have any questions for me at this time.

Interviewee: No.

Interviewer: I am thankful that you have helped me. I will keep you posted. Thanks for your help.

Interviewee: No problem. Best of luck with your thesis

Interviewer: Thanks. Good bye

Interviewer: Good bye.

Interview Transcript – Company D, Founder D

Before starting the interview, preliminary introductions were made. Interviewee asked me about my topic area etc. I thanked him for taking part in the interview.

Preliminary questions were asked before moving on to the main questions

Interviewer: What was the incorporation date of the company?

Interviewee: April 2015

Interviewer: How many employees do you currently have?

Interviewee: 5- 10 employees

Interviewer: Can you tell me about yourself?

Interviewee: I did my graduation in agriculture- agriculture graduate. This agriculture council Research India which conducts all India competition for selected candidates in state agriculture university. I belong to a district called Gaya in Bihar and I did my

schooling till 12th, from there I qualified this competition and got admitted to this graduation programme which is a 4-year programme at university agriculture sciences- Bangalore. From there after 4 years, there is a ministry of agriculture Institute in Hyderabad called Manage – All India Exam for people who want to take up agri business which is called Postgraduate in Agri business. Around 30 seats in India, I qualified that exam and got admission in Hyderabad. From there basically I did my MBA. I started my career at DCM Shriram Group where I was picked up from the campus- there I learnt the marketing aspects of agri business, basically as a management trainee for almost 2 years I stayed with them and from there I worked with many corporations in India – with start-ups. More than 12 years I have stayed with corporate – I have worked with government as a consultant. Basically, all my career has been related to various aspects of food and agriculture business. My assignments with start-ups – 5 years, I have stayed with start-ups. I realised I had tried entrepreneurship before and then thought this is the right time. Earlier when I tried I was too new in the market. I have gathered 12-13 years of work experience, now this is the right time to start something and I had developed lots of contacts in the market and with the investor community in India.

I was in touch with a gentleman for almost 10 years and he had evaluated a number of projects where we could have joined- either he was not ready. He is a serial entrepreneur already – he fully created 2 companies and sold his companies to public listed entities in USA and India only last year. He accepted a company he had invested into and we were already in touch. We got in touch again and he was already interested in food business – food technology and does something related to food. I also gathered lots of experience in the corporate sector and then we decided- let's start something and then we started – doing research, finding the gaps and then when we started looking in the market, we evaluated many different concepts but we realised in India, if we go today, go to a superstore, we saw a clear cut gap in the beverage segment – because all beverages on the shelf whether it its high calorie as we all know type 2 diabetes is very common in India- now India is already diabetic capital of the world. We realised sugar is one of the culprits – lots of consumption of sugar- can we do something where we can design a product which is different from what exists on the shelf today – majority of them. We came out with this product – water based soft drink with almost zero calories where we are using Stevia as a sweetener instead of sugar. It is also enriched with vitamins because urban lifestyle

we stay mainly indoors, immunity levels are low and we are exposed to urban pollution and smoke and all that. We enriched with vitamins to boost the general immunity levels of our body an also in the urban lifestyle most of us eating habits suffer- also because of work schedule- we also made in pre-biotic –to make the digestion proper. We were able to design a beverage which will keep our body healthy inside by keeping digestion proper, keeping immunity levels high and avoiding non-required calories- that was the idea we felt was important and then we were able to develop that composition through R&D. So, the product is already in the market. We are working on other variants of the product. Initially we launched the product in mango and lychee flavour. No, we are getting good acceptance from the market. People are in need of these products and then there was a demand for more variants – launching orange and guava shortly and then we are tweaking the composition a bit – coming out with more variants. We fortified the product with vitamins B3, B5, B6. So, we are looking for fortification in other vitamins-other things we can launch more variants. So, it has done well and the time when we started we have come a long way. It is a short journey but a fruitful journey I would say. Now we are looking to expand our business. We are testing our product in Bangalore. We started selling in other cities- we are targeting metro cities to start off with. We started selling in New Delhi, Hyderabad, very shortly and likewise we are expanding in India A lot of inquiries have come from other countries as well. We have applied for the licenses as well which are required for exporting. So, we are exploring export opportunities as well. That has been the journey.

Interviewer: Very elaborate and fruitful journey I must say. I did read on your website, the name of the product which you currently have is "X".

Interviewee: Yes

Interviewer: So, you have mentioned the product is in the market. So, I want to know what problems did you face in bringing this product into the market.

Interviewee: Not much. In fact, ... this thought was always hanging in our minds that we will face lot of regulatory hurdles but frankly speaking it was not too hard- it was a smooth journey, everything has become online. The government has done a lot of things at the buck end. Starting a business in India is not so tough. It didn't take substantial efforts or time from our side or money to actually get approvals from the government. It has been a smooth sail basically. However, there was one real challenge which we faced - We had to use sweetener which would taste as good as

sugar but without the side effects of that sugar. So, that was the trickiest part. So, when we started researching that, not many options were available- whatever was available was more of a synthetic/chemical option which we never wanted to use and in the natural option- there were lots of limitations – in terms of taste profile. That was the biggest challenge we had to crack and took us a lot of time and research at ground level to pass that barrier- so we have got a thing which tastes as good as sugar without the side effects of sugar- like high calorie thing.

Interviewer: Great. That is the end of my questions. Do you have any questions for me?

Recording stopped. I answered all the questions and thanked him for this time once again.

Interview Transcript – Company E, Founder E

Before starting the interview, preliminary introductions were made. Interviewee asked me about my topic area etc. I thanked him for taking part in the interview.

Preliminary questions were asked before moving on to the main questions

Interviewer: What is the incorporation date of the company?

Interviewee: July 2013

Interviewer: How many employees do you currently have?

Interviewee: 15 employees

Interviewer; Can you tell me about yourself?

Interviewee: I was born in a small town called Balariee, about 30 km from Bangalore and I did all my education there. For Engineering, I went to another small town which is called Dwangaray where I completed my Computer Science Engineering.

After that I worked in IT for 2 years in Bangalore and then I travelled to the US for work and I worked there for 8-9 years and then I came back, Then I was doing my, then I joined my family business which is mining, so I did that for 4 years and then after that I started this venture.

Interviewer: So, I want to know, what problems did you face as a founder in bringing these products to the Indian market.

Interviewee: See, like I said, these products are not. Somebody don't even know what is a wall bed. Forget about X. The concept itself is not very popular. See when they think of a bedroom they think that there has to be a bed or cot so they don't even think that you know there is an option of X, so that is our challenge. That is the

problem we are even facing today that people are not looking for it, people don't know about it, so first thing for us is to educate the customer about this kind of product and then they can buy and all that – that comes secondary. So, the challenge is to make the concept popular and then sell the furniture. Right now, people who are aware of wall beds, they are only searching for it, coming across our furniture and buying it.

What about those people who are buying cots everyday- so millions of cots sold everyday but you know those are traditional cots, so for us the challenge is to educate the customer that is huge? And the second thing is there is a no huge big competitor for us- you know he can educate the customer, the customer can compare like Sony makes a TV, Samsung makes a TV, easily you can compare the products and the benefits of it. So, for us, there is nothing like that. First, the customer is not even aware of the product and second you know there is nothing to compare to. So, that is our challenge.

Interviewer: Ok. Great. That is the end of my questions. Do you have any questions for me?

Recording stopped. I answered all the questions and thanked him for this time once again.

Interview Transcript – Company F, Founder F

Before starting the interview, preliminary introductions were made. Interviewee asked me about my topic area etc. I thanked him for taking part in the interview. Preliminary questions were asked before moving on to the main questions

Interviewer: What is the incorporation date of the company

Interviewee: August 2014

Interviewer: How many employees do you have

Interviewee: 26 employees (4 employees and 22 labourers)

Interviewer: Can you tell me about yourself?

Interviewee: I have done my UG in biotechnology and before that... my family is basically concentrated in Tirrupur. My family is in fabric processing division. I wanted to start-up in garment manufacturing. After my undergrad, I did my postgrad in Management from BITS Pillani. Then I came here. I was a trainee at my dad's friend firm and I started up. I had 1 years of training in another concern of similar stature.

Interviewer: I was going through your website this morning and I can see that you have a range of products for X, Y, Z. So are these products in the Indian market right now.

Interviewee: My customers like in the last 1 year we are working with polo shirts and right now we are also working with the export market. Yes, my products are in the Indian market.

Interviewer: Ok. So

Interviewee: I am not targeting individual customers. My main customers are branded owners like for your understanding it is X. These are brand owners. What they do is their own planning, their own design, they source it from us at a premium and they sell it to the customer. So, my customers are these branded owners- brand of chains and not the end consumer. It is B2B.

Interviewer: That is fine. So basically, I want to ascertain if these products are in the Indian market right now what problems did you face in bringing these to the market. Do you think there were any challenges you faced?

Interviewee: See my business is basically B2B. It's not like what my products are doing in the market, that doesn't count. For me the challenges I faced is giving them business- because it is a garment manufacturing business and a lead tight margin business. So, for me to go and get a new customer it's important that I must be competitive in pricing as well as having certain standards in place like employee

benefits, employee schemes because post this there was an incident. I mean 3 years back in Bangladesh where many textiles industries got damaged because of no safety regulations. Since then all customers are making it so clear that all standards must be followed. So, the challenge I face in my play of work should be that all standards established. There must be no errors, handling all safety procedures should be made. So, that was the big challenge and apart from that pricing- each and everyone knows what price and what it is going to take for each product. See for example, what is the yarn price, what is the cotton price, these are accounted. Going to a customer, they will know if I am putting Rs 150, they will know what is the real cost of the product. See, if I am putting Rs 150 and the cost of the product is Rs 100, they will not come to me.

Interviewer: So, you must be competitive in pricing.

Interviewer: Great. That is the end of my questions. Do you have any questions for me?

Recording stopped. I answered all the questions and thanked him for this time once again.

Interview Transcript – Company G, Founder G

Before starting the interview, preliminary introductions were made. Interviewee asked me about my topic area etc. I thanked him for taking part in the interview.

Preliminary questions were asked before moving on to the main questions

Interviewer: What is the incorporation date of the company

Interviewee: Aug 2016

Interviewer: How many employees do you have?

Interviewee: 5 employees

Interviewer: Can you tell me about yourself?

Interviewee: My interest lies in ideating and bringing out consumer products which can have a positive impact on society and people lives. I graduated in 2013.

My bachelors was in Electronics. I did that from Karnataka – north of Karnataka, there is a city called Gulgarga- I graduated from that city. So soon after my graduation

I landed in Hyderabad in search of jobs and I worked in Tech Mahindra for 2-2.5 years as a software tester and then I quit my job in May 2016 and then I started my own venture in Food and Beverage. So, it's basically an interest not to bring a food

item or a beverage item, it's my interest to build consumer product that can be implemented at a larger scale, so it happens to be that, beverage stuck in my mind and I am working on it now.

Interviewer: Okay. I was going through your website yesterday and I can see that the product name which you currently have is X

Interviewee: Yes

Interviewer: I want to know if it is in the Indian market right now

Interviewee: No, it is not in the market. It is about to launch in a couple of months.

Interviewer: So, as a founder of this company what problems do you foresee in bringing this product to the Indian market.

Interviewee: For the product, the primary obstacles or the problems will be the awareness. See the drink is one of its kind in India. As it is a health drink, basically it is a vitamin water and we are adding water. Since, I have not given an introduction about the product we are calling it as fuitamin drink. Fruitamin is the new word we are calling it for the Indian market. And it is basically fruit vitamin flavoured drink. We add some good amount of vitamins to the water and bring it out in a proper package and make it available to the consumer at an affordable price. So, the primary obstacle would be the awareness – the awareness is not there in the Indian market so even if I put the product in the market or in a reputed supermarket, people will have to choose the product based on the design, they will not choose the product based on the proposal, or its ingredients, or what it is offering to you. They will go with regular customer mind set, if the label is looking good, if it is looking good, it is affordable, I will go for it so like that. There are so many products out there which will give you competition over labels/price. What proposition we are selling here that matters most – awareness is what we are creating to woo people's mentality like the cola drink or irated drinks – the awareness matters, the awareness is I guess 1-2% in Indian market whether you consider all kind of ages- you take 18-25 or even 13+ or school going children they do not know what vitamin water- do not know what beverages are available in the market. See, they just go by the label, just go on pricing and pick up the bottle. Primary factor being awareness. And the second thing is availability of these kind of drinks in almost all the places. If at all there are other beverages which are working in health functional beverage sector, they are only present in supermarkets, in glossy areas, they are promoted in a proper manner. There are not available in regular clubs, café's, bakeries, or restaurants. So more

and more what you call, availability will be there, options will be there to choose from. So, first is awareness and second is availability.

Interviewer: I have noted in down. Okay. Great. That is the end of my questions. Do you have any questions for me?

Interviewee: Towards the end of the interview, the interviewee stated some other points relating to the obstacles in the process of entrepreneurship. There are some, quite a few challenges /obstacles when you setup a company in India or you want to sustain the company till the time the product comes in the market or when it takes shape in your company. Obviously, the primary thing being the funding, whether founder puts his own money or takes money from family or friends or even private investors, that is pretty tough in India considering the scope the government is creating. What I see is people/investors will never invest in a start-up idea, they need some round of attraction for any kind of product in order to reduce risk of investment, which is completely different in US or western side of the world. If they like the idea, if they like the plan which the entrepreneurs are promoting, they will definitely go ahead and invest in that idea. The second one is your family. In India, you being from India, will definitely know, if a person wants to quit his job and go for entrepreneurship or do something of his own, the entire family will pull him back. The family first pulls the person back to his roots to pursue a job or whatever else he/she wants. Family is the second biggest barrier when you pursue entrepreneurship, that is definitely to take for because that adds a lot of mental stress while you are doing your job which you know obviously. So, obstacles if you want to add to that. Right from getting an idea/incorporating a company and sustaining it till the time you bring a product in the market, funding and family place a key role and unfortunately they become the obstacles in your journey.

Interviewer: That's for that. I will note it down.

Recording stopped. I thanked him for this time once again.

Interview Transcript – Company H, Founder H

Before starting the interview, preliminary introductions were made and background information about the topic area clarified. I thanked him for taking part in the interview. During the interview, the research participant told me that he has two startups currently running, I suggested the first company comes under the purview of low to medium technology sector. asked the interviewee if he had gone through the

interview brief and told the participant that he could ask questions during or after the interview, to which the research participant said that interview is all about asking me questions.

Preliminary questions were asked before moving on to the main questions

Interviewer: What was the incorporation date of the company?

 Interviewee: Jan 30th 2016

Interviewer: How many employees do you currently have?

Interviewee: 8

Interviewer: Where is, your start-up based.

Interviewee: Bangalore.

Interviewer: Can you tell me about yourself.

Interviewee: Basically, I am a technology guy. I have been with Microsoft for 15 years close to 10-15 years in technology and the related field and prior to that I was with Boeing and Fujitsu and several other companies as well. And much earlier than that I ran my own automation company prior to that – fundamentally industrial automation. Through all this journey, working on multiple projects etc. there was a lot of people connect. Technology is a great, it is great enabler etc. but ultimately there is a lot of, the tangibility was not there in most of the work that I was doing and hence I came back to Food Health. So, I was running this stuff from the US and then I gave my resignation and then moved to India. I wandered India and trying to find out what is the problem I want to solve – so it is a process of discovering the problem and it is process of self-discovery – one of the fundamental issues we are facing is with farmers – a high number of farmers, you know have trickled down economy. I do not think things were trickling down – to rules section as much and that urban and rural divide wider and wider, have and have not are getting greater and greater. We thought how can we make a difference to this- you have a problem statement but how you solve this and hence this is the background and how X was formed- it's more like a channel we can get a lot of rural products into the urban market.

Interviewer: Do you have a website

Interviewee: abc.com

Interviewer: Could you provide me with a few names of products you make

Interviewee: We are basically focussing on millet based products, so if you look at X, x in most Indian languages means a village and then we add millets to it and that's how we came up with X. X stands for village millets. Millets is one of the oldest

grains in the world, so when we look at you know what is the sustainable model where we can bring a good product into the market, we thought millet is actually a good superfood that people have forgotten about and then, if you go back in history, sometimes grandfather times, it was a staple diet and then it has slowly gotton away with rice, wheat, all these things which were high yielding which made sense over those times, but with increasing population with less water, we have to go back to the roots – millet is a great product.

Interviewer: Okay. so, these products are in the market now.

Interviewee: Correct.

Interviewer: Okay, I want to know, what problems did you face as a founder when bringing these products to the Indian market.

Interviewee: Multiple challenges right. Number 1 is as much as we say, the Indian government is not very industry friendly. So, we have to…….. start something. So here is some guy from US and I am trying to do something, getting people to eat healthier – people do not care, people say what is it in for me and so we have to continue to grease the system and pretty much bribe people to get things done. Second is lack of infrastructure as much as we say, we get electricity, power all those things getting it in a state of Karnataka is very difficult. Third is "trained labour force" – there is lot of labour but they are not trained labour force/skilled labour force. So, these are the three fundamental issues we need to overcome. Today issues were there, getting equipment, at least we can import it without any issue, so we are able to get things done, but still erection and getting things together etch putting infrastructure is not easy.

Interruptions. The interviewee continues: so, this is to start the industry. Then penetrating the market is also difficult. Because we as a start-up we are not like a multinational, so when we try to get shelf space, our product is sold out of shelf space. You have these guys like Y who come and pay off distributors not to keep competitors' products. So, when we go inside and found 2 weeks later we are off the shelf and we asked this guy, hey what happened to our products and the guy say it is in the backdoor, back office because we are doing a promo for ITC, they are bringing a bunch, giving us better margins and hence you guys are out of the shelves.

Interviewer: Understandable, if we look at startups and MNC's both have different set of constraints and supermarkets will go with a company which will benefit them.

Interviewer: So, you have mentioned about these problems you faced as a start-up, according to you, what issues should be addressed which would help your startups are flourished, I mean you can more easily compete with large multinationals.

Interviewee: See the first half of what is needed is health right, see the second half is market forces. So, when you are taking on an 800-pound gorilla, like a multinational it could an IT company or any other company. As a start-up, we know that is the gorilla we have to go against. We are ready to do that, but when we are trying to do something, you are expecting infrastructure and the licenses etc. to be lot easier to procure and then for the government to stay out of the fight, so that we can be more competitive, because when I am taking on training my resources, paying off bribes, I do not have the resources to fight the big boys and they have a factory of lawyers who would fine the government etc., so they get their licenses and stuff faster. To have a level playing field we need to get government out of these things, make the process as transparent as possible, get everything to be online, registering a company, go and get your term licenses, go get your factory out and be done with that. And as you grow to say 100-200 people then you get the labour guys, to do the labour licensing, to do those other things but from day 1 if I am going to do all that stuff, mostly co-founders we are 1 or 2 people, it's also our energy, attention – do we focus on market, getting products out or we get things done. A change of focus or a shift of focus takes place. So, if we had a transparent process where things are online and we could have actually done it, there are now countries you can get turned around in 24 hours, something similar to that account.

Interviewer: I mean I totally agree, governmental support is one of the crucial factors and obviously, there are the driving forces of any.

Interviewee: I am telling the other way about – I am saying the government should stay away from all this.

Interviewer: Okay.

Interviewee: I mean provide greater transparency, allow the entrepreneur to register its company, and move forward with these things. We are not looking for any governmental help We are looking for less governmental interference.

Interviewer: So, would you say that if these factors, "less government interference", "good infrastructure", "skilled personnel" if these three factors are addressed, it will be a lot of easier for startups like ours, to bring easier to bring products to the market.

Interviewee: Yes, Absolutely

Interviewer: Okay. I think that is end of my questions. do you have questions for me? Recording stopped. I answered all the questions and thanked him for this time once again.

Interview Transcript – Company I, Founder I

Before starting the interview, preliminary introductions were made. I asked the interviewee if he had gone through the interview brief. I thanked him for taking part in the interview.

Preliminary questions were asked before moving on to the main questions

Interviewer What was the incorporation date of the company?

 Interviewee: March 2014, December 2014

Interviewer: How many employees do you currently have?

Interviewee: 12 (shared between both the companies)

Interviewer: Can you tell me about yourself

Interviewee: I can probably give you a brief history about my career that will help you understand how we started the company. I come from an IT background working for IT companies in Bangalore. I had an opportunity to work for 3 companies for 4.5 - 5 years from 2003 - 2007. worked with pretty good projects, had a good exposure to the international markets. one of the companies based in California and gave me a good exposure to international markets and that was a service oriented projects. we were part of clients in overseas markets and gave me good exposure. then I was part of environmental services at that point of time, there was lot of use of about carbon credits and carbon savings that was going on well in Europe at that time. There were new regulations - Kyoto protocol was established by the UN and other countries who are generating excess amount of carbon, they need to compensate that. so basically, that was my starting point in terms of studying and research about the project outside of I.T. domain. that way I got very much interested, started learning, started exploring opportunities and in fact the first project that I landed was with a client in Germany who are looking for carbon calculators - they were a recycling company and they wanted to know how much carbon footprint they created in terms of day to day activities and stuff like that, so I had an opportunity to work with them, learn about their business and help them with the technicalities of saving the carbon, that gave me an idea about the recycling industry. I did a project on e-

waste which I floated in the market and seeking someone to work with me on the project. we found a couple of good investors because 2008-2014 was a bad time for people who were in the industry because of the economic downturn - there were a group of investors who wanted to diversify at that point of time. we got in touch with each other and we started working on the project and they invested in my company and partnered up with one of my close friends who was at that time in US and we used to run a small IT firm at that time so we partnered up and started speaking up with the agencies in the US about the service and we found good business opportunities in North Carolina. we went there, started our business, the government was really helpful, we started working as a government contractor, that was a strong shot business and that project went from 2008-2013 , the company is still running but I am not part of it, I am still a consultant over there, I sold my stake in the business, the company is still running strong and we did a merger with another company from the same state so that helped me out in terms of delivering the technologies and giving the command of the business. while we were doing that, we had a good amount of warehouse space. in 2011 we saw an opportunity about doing warehousing for several partners -we setup a small company, the website name of strorageship.com. basically, you store products of clients from overseas markets and ship it to their location or client locations - we landed a lot of e-commerce contracts, at the same time there were lot of Indian groceries who were looking for expansion so they got in touch with us and they asked us if we can help them, so that's how my focus shifted on the food segment.

Interviewee: You good with Indian food

Interviewer: Yes

Interviewee: So, they contacted us. we need a company who could help us with the storage warehousing in this branch. we thought why not explore this option. X was one the primary companies that got in touch with us. started working with them, while we were doing, I saw an opportunity that just like in states we have good demand for Indian products with all its exclusivity. X has a greater importance compared to what we have it in India, so I thought why not see the same scenario for foreign products in India, so we started doing some studies, I found a company in Bangalore who were doing case studies .... planning to bring X products to the Indian market, what would be the market for it and so we got some numbers, we did some online surveys, social media surveys and figured that the market will definitely be growing

in the next 3-4 years so that project was made and looking for right opportunities, right time so fortunately we found someone to take care of the company and take up..... sold my stake in.... and we started this company. so right now, we are doing in X segment. we are mainly into the ..... that's hot meals restaurants and catering ... is a huge market in India ... unorganised market , underserve segment and that is something which will grow out very fast next few years because we have similar companies in US who would be serving X as well as Y, .so they are the behind the scene players who are into the suppliers, who are into the deliveries and who help the franchise restaurants run smooth, so we decided that this a good model, sustainable model, a model that can grow out because Indian restaurant industries just getting into the franchise model now, they have dominos who is doing good, we have cafe coffee day in India which is doing good, but other companies are yet to have that scale because of the lack of , lots of technical factors such as unavailability of products which have a better shelf life , so we started working on this project where we would be able to help the clients, help them with products and services.. and see if we can achieve product stability or achieve a greater shelf life, that's when we started working couple of years back and since then we have been growing ..... in terms of marketing we don't have a bigger team ..... handled by me . we are assisted with couple of our staff members who would do case studies or research. as of now I am the point of contact for my clients, so X we started 3 yrs. ago. now we have good customers, we have been working with some airline kitchens, we have been working with several good restaurants chains, we do work with corporate customers as well. now we are getting into the second project which we started last year - Y. while we were working with this restaurant chains we figured out that most of them are into the fast food segment and there has been a very good promotion about eating healthy foods and eating natural foods , thanks to a company called patanjali in India , they have been promoting good food and healthy food stuff like that , so now people are looking for alternative options of eating out, so we thought why not come up with a project which would serve healthy fast food   and that gave birth to Y. the company was established couple of years ago but operations started last year because what I do is for any project for me to start out, I find 1 or 2 suitable partners who would be helping me with the back end or with the operations , so we figured out, we found out a couple of good people who were willing to work on this project, there is a guy in my company called A, he is an MBA

from Bangalore, he takes care of the operations of Y, so with Y, what we have done is that we have entered into the franchise business itself and its hybrid model wherein we do subscription based business , so our business model is much more secure , unlike a restaurant who has to rely upon the walk-in customers so there are ways when we have a lot of good customers, there are days when we don't have any customers, so that is where the uncertainty plays a bigger role in terms of success or failure of the business, so we decided that we need to fight this issue because that can be a major impact when we don't have customers for few days, business can get into a panic mode, so we started promoting the subscription services as soon as started the business and now we have doing it in 2 locations now, Rajkot and Ahmedabad we have just started, we have 40 such subscribers for juices, we have subscribers for salads and meals like that, which will help us to there is a minimum amount of revenue that is taken care of which will take care of salaries and upfront costs and will help us to stabilise the business and sustain it

Interviewer: in the beginning, you mentioned about lot of work experience before you started these two companies, little about your educational background, I mean you have an IT background, can you expand on that, I mean which university.

Interviewee: I did my diploma in computer science from PES: people's education society, it is a very reputed college in Bangalore. I did diploma studies from 2000-2003.

Interviewer: Okay, and then you did a under - graduation in I.T.

Interviewee: No, I didn't go for it, I landed a good job as soon as I done with my college and I was planning to go for further studies after 2-3 years of experience but it didn't materialise because I was already out of job and I was doing a lot of projects, overseas projects so it didn't give me time. then again internet is a very good medium to learn so I am self-educated in lot of things, we do a lot of social media activities, lot of data mining, other projects which would require IT skills but again courses are there now. there are lot of online tutorials so I spent a lot free time doing studies through this tutorial on internet which helped me expand my knowledge and again with the food business when we started, we didn't have much knowledge about it. there was one programme in North Carolina. university, we took up a class when I had a chance an opportunity. I also had an opportunity to work with North Carolina department of agriculture as a consultant so that's where I learnt about food source, techniques, theories good storage techniques and stuff like that which is still

not being used in India but basic information or basic knowledge ......like I was visiting the farms, the dairies over there and I was actually doing a practical study of which helped me when I got into business of food / or food industry, so that experience has helped me a lot.

Interviewer: I mean if one wants to start a business, work experience helps. I think that is a very good expansion on my first question. So obviously these two companies which you currently have, these products, would you say these have been commercialised or these products are in the Indian market right now.

Interviewee: Let's start with X first. We started with peanut butter which was our primary product and tahini, for tahini we were the first company in the Indian market and for peanut butter we thought we were the first company, one of the major companies' sun drop that started peanut butter manufacturing and sales. peanut butter has been manufactured in India for over a decade but most of it was for the overseas export market and I was looking for an opportunity to develop the speciality food segment market in India,

I decided that we will train the products for Indian markets, when we started retailing there were a couple of companies apart from us who started doing this and now there are good number of companies starting out but there are big companies who are in this market, a lot of them are in the same product segment that I am in, but their network is very big, so their turnovers, revenues are close to 200-400 crores a year. we hopefully look forward to create it in the next decade

Interviewee: So, the main two products for X are X1 and X2 which have already been commercialised or they are in the Indian market.

Interviewee: We did those for the retail market but for Orica or institutional sales we have a portfolio

Interviewer: And what about Y

Interviewee: Y, is a very conceptual business; it is health food cafe ... in the Gujarat market located right now. we are looking at a very unique business model of subscriptions so cold pressed juices are one of our primary products, there are 3 or 4 companies now, out of those 4 companies, three are heavily funded, VC funded, so they are doing good, they are in a bigger market - Delhi, Mumbai, Bangalore, Pune, but they have only 1 product - cold pressed juices, so we didn't want to get into a retail model , I don't want to get a bottle and sell it to a retailer and that retailer would sell, so then we decided that we want to go B2C model, so we set up a

restaurant, we setup a delivery model, we setup a subscription model and that is how we are growing .. so it's more like an ordinary growth of business where customers can stay loyal to the product/service because they are not buying from a retailer, they are buying from a company ..so we would know our clients preferences , so we know what they like, what they don't like, what are their dietary concerns and based on that we sell them, so right now our biggest customer base are gyms, yoga centres, health clinics, hospitals, so this is more of a need based market rather than a leisure based, like if you go out to have pizza, it's something you might go out once a week or twice a month or you might need something else but this we catered to a small segment but we catered to customer segment who would be buying at least 20 times or 30 times ... so my per customer revenue would be much more higher in terms of billing value which is where the sustainability plays a role, so the product is also unique and the business model is also quite little unique.

Interviewer: So, you mentioned that Y is B2C market, x is its B2C or is also B2B

Interviewee: It's more like a B2B... we are mainly into the institutional sales right now so we do sell our products on amazon, we do sell our products on e-commerce channels in India but the major chunk of revenue comes from the B2B market

Interviewer: Right okay. So, with these two companies in mind and different business models, different products which you are selling to, one is a B2C and one is a B2B, so I want to know what problems did you face in bringing these products to the market, to the Indian market, specifically so problems could be internal to the company or external to the company, so I just want to get an idea

Interviewee: Sure, let's start with X first: the main issues which we faced in the initial time was again new to the market, lot more connections with distributors ....it was tough journey for the first 18 months we were not doing good with online market, we were doing good with e commerce big baskets ....they are aggregators, they will let you use the product , sell it deliver it, but retailing that was very tough for us, not only for us but for any Indian market who is getting into a retail segment, the issue is that the market is very disorganised, you cannot actually find out the list of 10 distributors in Bombay or any other city. the challenge for us was to find the right distributors, find out the ... we conduct business with them because we don't have unlike US where everything is organised, you manufacture a product, you work with a centralised distribution channel company and from there you just have shut the whole distribution network. here you have to. speak with someone, negotiate with

someone ... paperwork doesn't matter because the market is very disorganised, so that was our biggest challenge for us but eventually while we were staying in the market for a longer period, we went through the good times and the bad times, found a couple of distributors who are not paying their fees/dues or are later or behind in payments.... not doing deliveries in a timely manner, so we had to take losses, take products away from them, cancel a contract, find another one, so yeah first 18 months were really bad, lot of down times in terms of deliveries, lot of money being spent on marketing activities to go out and meet people, reach out to them and figure out that we might not be the right business to work with, so it was the biggest challenge, it's still a challenge for other Indian players in the market and we don't have system wherein we have a centralised agency or distribution companies acting as marketing agencies, so that our biggest challenge . For Y, , we didn't see much of a challenge, what we saw was that we have to create a lot of awareness in the market., because people were not aware about the health food, like when we came out with the product, and said its good and healthy, this is gonna help you ... dietary requirements and he was like "yeh bach kya raha hai", what is he trying to sell. we had to do sessions. it was big learning curve for us. we did lot of road shows, we did lot of events. in the past 1 year, we did almost 8-9 events every 35-40 days there is 1 event lined up either at a mall, either at a food event. in fact, next month I am organising a food festival is Rajkot which is currently very big... so these kinds of events have been planned and executed, we did radio promotions activities, so those are the thing we have been consistently doing because we don't have a similar product in the market where we can tell that this is coke, and this Pepsi, so as you are drinking coke, we are selling a similar product in a different bottle by the name Pepsi. so, we had something to showcase them, so we were the first people to launch it in the market.

Interviewer: I guess both the companies you are working in, they have different business models and different products which you are selling to the market and obviously you will face different challenges, so in the first company, X, obviously it's not really related to health as opposed to second one and Y, which is health related company selling cold pressed juices, awareness will be important because at the end of the day the product will be consumed by the masses and if they don't know about the product, they won't take it, so I think it is understandable , awareness

would be the biggest challenge. I mean do you have anything to add apart from these two points, is that it,

Interviewee: With Y, now that we are expanding so now we are looking at this product to be reaching out to most cities so we have been talking to investors, we have been talking to franchisee, partners, we have been talking to lot of people .... it's a continuous learning process, this project would be in the next 4 years when we reach out to bigger metro cities either Bombay or Bangalore...from there we can go and expand. Right now we are with a group of investors to see if they can take a bigger chunk of money into this business so we can grow it out , the validation of the project has been taken care of, the prototype has been good, the initial market attraction that we saw those has been good, so now I can confidently go out in a bigger market and showcase products , so that challenge of market validation was a bigger part that we were able to solve in Y, now it's about right execution into the right market

Interviewer: Do you have plans to expand. I mean do you have plans to bring these products to the international markets or will these be just in the domestic market.

Interviewee: for Y, we might be but for X, because the Indian market is so huge so we don't see a need. and again, we are selling international products to the Indian market. so, in US, Kraft is a very big company so I would not be able to .....bigger brand already established. so, Indian market for me is a virgin market, so in this I can spend the next 20 years .... works out well.

Interviewer: I just hope everything works well for you. I think that is end of my questions. do you have questions for me?

Recording stopped. I answered all the questions and thanked him for this time once again.

Appendix 2: Interview Questions

Preliminary Questions

1. Incorporation date of your company

No Rationale

2. No: of employees in your company

Rationale: The researcher wanted to ascertain whether the companies interviewed met the no: of personnel parameter (50 employees or less) in line with research (Grant Thornton, 2016). Any of the companies interviewed not meeting this criterion would not be deemed as an "Indian start-up" and thus would not be included in this research study.

Core Questions (applicable to both Indian start-ups operating in high and low to medium technology sectors).

1. Can you tell me about yourself?

Rationale: The researcher wanted to explore whether founder / co-founder knowledge, (acquired through education, networks and work experience), and other personality characteristics played a role in commencing their new ventures. This is in line with Shah et.al (2005) who states that entrepreneurship process is also driven by entrepreneurial factors such as motivations, characteristics and firm resources in addition to external factors. All the internal factors such as knowledge and personality characteristics form part of Human Capital which is part of the Resource Based View (one of the theoretical frameworks proposed by Wernerfelt (1984) and other scholars such as Barney (1991), Peng (2009), & Peng & Meyer (2011).

2. What is the name of the product (in the case of low to medium technology) / medical device (in the case of high technology)?

No Rationale

3.Is this/Are these products/medical devices in the Indian market right now?

Yes: What problems did you face in bringing this product/medical device to the Indian market? OR

No: What problems do you foresee if you were to bring this product/medical device to the Indian market?

Rationale: The researcher was curious to find out as to whether the founder's products were in the Indian market and depending on yes or a no answer, the researcher wanted to further explore, what problems did founders/co-founders face or will face should their products eventually commercialize. This interview question was central to the research study. In line with existing literature various barriers to innovation both at the creation and the commercialization phase are cited for example: financial (Blasco 2008), competence (Blasco, 2008), organizational (Larson & Lewis, 2007), legal (Farsi & Toghraee, 2014), risk (Larson & Lewis, 2007) and market (Blasco, 2008).

4. Do you have any questions for me?

No Rationale

Appendix 3: Theoretical Framework

Internal Barriers

Resource Based View

Barriers affecting innovations among Indian start-ups operating in high & low to medium technology sectors

External Barriers

Institution Based View
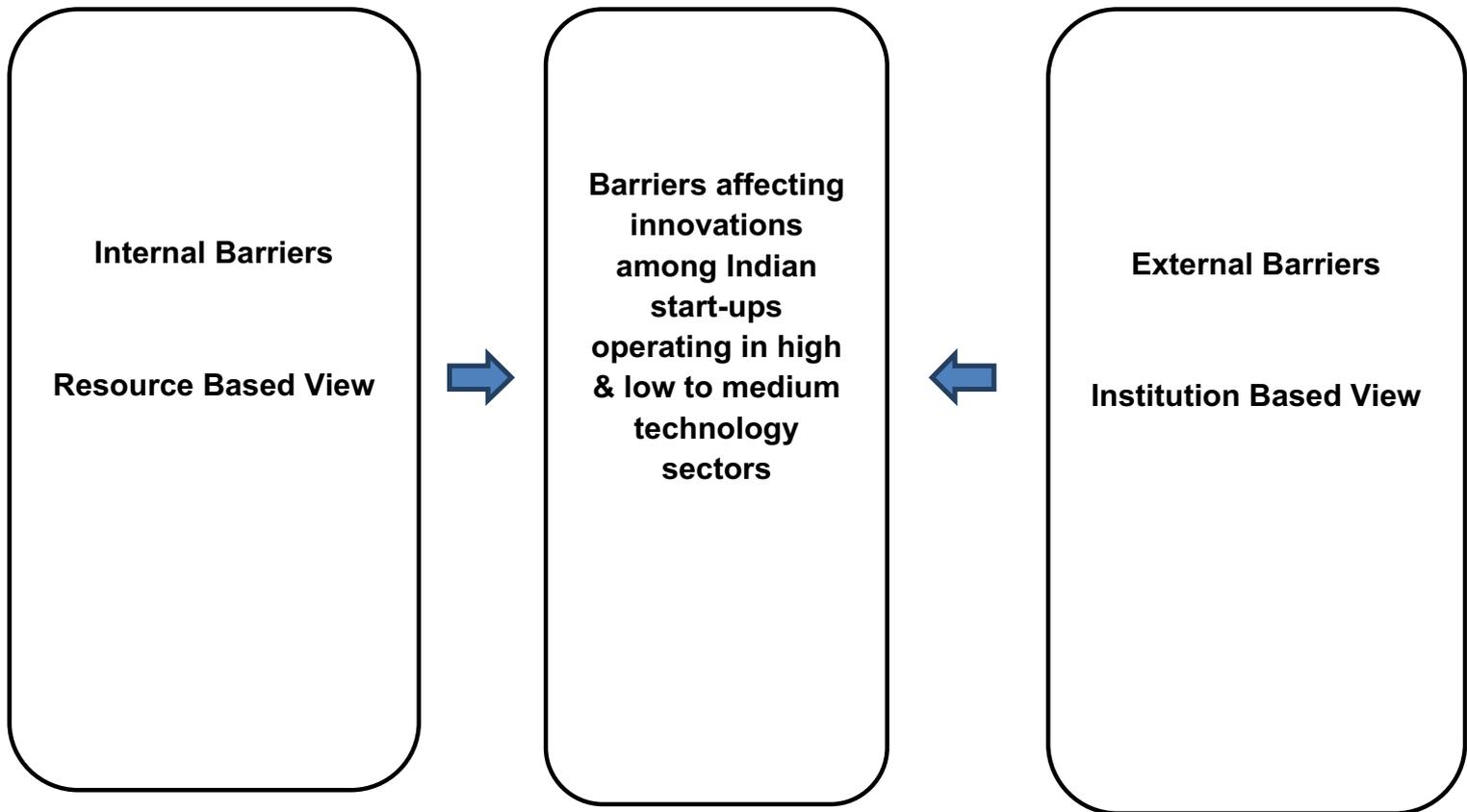
Appendix 4: Interview Participation Invitation Letter

To whom it may concern,

My name is Saurabh Gupta originally from India, Delhi. I am currently studying towards my MPhil in the field of Technology Entrepreneurship at Brunel University, Uxbridge, United Kingdom under the guidance of Dr Fintan Clear. I would like to take this opportunity to provide you with an overview of my research project. My research project is centred on "exploring barriers affecting innovation among Indian start-ups operating in both high and low to medium technology sectors and to observe any similarities and difference between the barriers.

To understand the above, I want to conduct video skype interviews (remotely) and want to get views/opinions from the founders or co-founders. The interviews will not last more than one hour and I can assure that the information discussed during the interview will remain completely confidential. All the information received will be stored securely in secured cabinets or password protected files. All references to company and founder's names will be anonymized and assigned pseudonyms. I would like to reiterate at this point that participation in my research project is completely voluntary and you have the right to withdraw at any time during the interview process without penalty. Upon completion of my project, I am happy to provide you with an executive summary of my research project. Alternatively, I will email a copy of my whole MPhil research project upon completion. Please note that the information you will provide me is for solely for "research purposes" and will be incorporated in my research project (adhering to complete confidentiality).

If you are happy with the information supplied above and willing to help me in my research, please do correspond with me via my personal email to arrange a suitable date and time for a Skype interview. I would be very obliged and indebted to you if you could revert with a response. Your cooperation in this matter is highly appreciated.

Please do get in touch with me if you have any further questions/concerns.

Thank you for reading my message.

Yours faithfully,

Saurabh Gupta

Contact: 0044-7809881288

Skype ID: Saurabh_2108

Email: saurabhgupta86@hotmail.com ; saurabh.gupta@brunel.ac.uk

Appendix 5: Interview Record

Interview Date	Org'n	Incorp. Date	No: of Personnel	Location	Time	Industry	Type
08th May 2016	A	2011	6	Bangalore (City in the state of Karnataka)	24	Medical Technology	Manufacturer (B2C)
10th June 2016	B	2013	15-20	Noida (city in the capital city of Delhi)	19	Medical Technology	Manufacturer (B2C)
7th May 2016	C	2014	6	Bangalore (City in the state of Karnataka	21	Medical Technology	Manufacturer (B2C)
11th Dec 2016	D	2015	5 to 10	Bangalore (City in the state of Karnataka	25	Food & Beverage	Manufacturer (B2C)
15th Dec 2016	E	2013	15	Bangalore (City in the state of Karnataka	17	Furniture	Manufacturer (B2C)
16th Dec 2016	F	2014	30	Tirrupur (city in the state of Tamil Nadu)	16	Textiles	Manufacturer (B2B)
19th Dec 2016	G	2016	5	Hyderabad (City in the state of Andhra Pradesh)	17	Food & Beverage	Manufacturer (B2C)
17th April 2017	H	2016	8	Bangalore (City in the state of Karnataka	22	Food & Beverage	Manufacturer (B2C)
23rd April 2017	I	2014	12	Rajkot (City in the state of Gujarat)	35	Food & Beverage	Manufacturer (B2B, B2C)