R&D Configurations and Innovation Outcomes

The Case of Swedish R&D Offshore

Rupin Jeremiah

STOCKHOLM SCHOOL OF ECONOMICS

R&D Configurations and Innovation Outcomes

More and more firms are establishing R&D facilities offshore to deliver innovation abroad, especially in emerging countries that are not always known to be centres of innovation. This thesis shows how R&D is configured offshore and what innovation outcomes emerge from such centres.

There are new results produced in this study:

- A firm's innovation outcome depends on its R&D configuration offshore. The R&D setup offshore is influenced by *decision accelerators* while the innovation outcome is affected by *decision decelerators*.
- Traditionally, innovation has been associated with learning. However, this study introduces *unlearning*, which can also lead to innovation when a firm offshores a part of its R&D.
- *'Distance-to-innovation'* is a new concept introduced, which signifies how far a firm is from delivering learning-driven innovation.

This thesis investigates the decision making process of R&D offshoring, using empirical evidence that is based on in-depth interviews with decision makers from 10 Swedish firms. The study will prove useful to both academics and practitioners; it will help them learn more about how decision makers in firms can make better strategic choices when offshoring R&D and how they can have an improved influence over the innovation outcomes of their firms.

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completed his PhD at the Department of Management and Organization at the Stockholm School of Economics. His research interests are in international business and strategic management. Before his PhD studies, he worked in various roles in project management, technology leadership, and software delivery.

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The Case of Swedish R&D Offshore

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To
My Family

Foreword

This volume is the result of a research project carried out at the Department of Management and Organization at the Stockholm School of Economics (SSE).

This volume is submitted as a doctoral thesis at SSE. In keeping with the policies of SSE, the author has been entirely free to conduct and present his research in the manner of his choosing as an expression of his own ideas.

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Writing a thesis has been more than just an academic undertaking. It has also been an almost spiritual journey of partial self-realisation, where I discovered many facets about myself and tested the limits of what I could achieve. In this quest for knowledge I am still learning, and while this thesis is ultimately meant to serve and benefit a wider audience, it is still only a beginning. I wrote this thesis between 2013 and 2017 while in the Department of Management and Organization of the Stockholm School of Economics. A large part of my thesis came to fruition in the year 2016 when I was a visiting scholar at the IESE Business School, Barcelona. This journey has been a long and at times an arduous one that would not have been possible without the help and support of many people along the way.

First, I would like to thank Professor Carin Holmquist, who as my primary supervisor believed in my ideas and my research style, and provided me with the support, timely feedback, and constructive advice whenever they were required. I am grateful for her time and effort. I would also like to thank Professor Udo Zander and Dr. Frida Pemer who were my co-advisors, for their valuable feedback and inputs that helped me improve my thesis substantially.

A special mention is due for the members of various departments at the Stockholm School of Economics for their help and support at several times in my journey. I would like to thank Marie Tsujita Stephenson who was the Program Coordinator of the PhD Programs, for her prompt and efficient administration activities, and Helena Lundin of the Research Office, for her help in the publishing process. A worthwhile mention is also due for Professor Andreas Werr, Head of the Department of Management and Organization, for his efficient handling of potentially problematic administrative issues.

I had spent the entire year of 2016 as a visiting PhD student at IESE Business School in Barcelona, Spain. I would like to thank Professor Bruno Cassiman for giving me that opportunity, and for being accessible and prompt with feedback and advice. I would also like to mention the contribution of the staff of the administration office of the IESE Business School for making my sojourn there productive and enjoyable.

In this significant milestone in my life, I also remember my father, who sadly is no more but who lives on in my memories. My biggest gratitude, however, is reserved for my mother and my sister for their unconditional love and support during this challenging and lonely expedition. Although they were far away, their support and encouragement were always available via frequent video calls. Without them, this thesis would not have been possible.

Stockholm, October 06, 2017

Rupin Jeremiah

Contents

1. INTRODUCTION

> "Life is either a daring adventure or nothing at all." (Helen Keller - author, political activist, lecturer)

Chapter Summary: In this chapter the motivations for pursuing this study are provided and the reasons why offshoring of R&D is relevant and interesting both from a theoretical perspective and from an industry viewpoint are discussed. The overview of the thesis and the research questions are introduced here along with what this thesis seeks to contribute to.

A little about me

I was born in an interesting year. Politically it was a time of unrest with the Yom Kippur war starting in Israel and was also the year when General Auguste Pinochet seized power in Chile in a coup d'état. In some positive news it was the year when the Bosporus Bridge was completed, linking Asia and Europe at Istanbul, which showed the extent of human endeavour and excellence. Equality entered the world of sport when Billie Jean King defeated Bobby Riggs in 'The Battle of the Sexes' and laid the foundation for equal pay in tennis for men and women. Women are now paid the same for playing 3 sets as the men who play 5 sets. So in tennis now the men are paid less per unit of work than the women, but that is a different debate. When I reached school-going age, I started studies in an Irish missionary group led boys-only Catholic school in New Delhi, which was somewhat austere, strictly disciplinarian, and provided comprehensive all-round education. The timeless values of honesty, discipline, loyalty, and integrity which I learnt from that institution formed the backbone of the person I have always hoped I can be. To this day I strive to live by the motto of that

school: *Sapere aude sincere et constanter* - Dare to be wise, sincerely and constantly.

For my undergraduate studies, I read computer engineering in the University of Delhi in India and was awarded my bachelor's degree in 1996. After completing these four years, I worked for almost fourteen years in various capacities in the information technology (IT) industry, in consulting, transformation, and outsourcing engagements. I travelled to many countries as a result of my work and got to experience different working cultures, management methodologies, and schools of philosophical thought. All this provided me with most of the tools I needed for a successful career in technology firms. However, during my time as a consultant, I observed how far removed management can be from academia. Although not necessarily a bad thing, it only suggests that the gap between theory and practice doesn't appear to be closing in any appreciable way. I had spent several years working in the United States, the United Kingdom, India, and Canada. Management methods and business practices were different in all these countries and yet inherently quite similar. There was still a lack of connection between theory and practice. All the principles and theory were available but somehow decision making remained somewhat individualised and subject to interpretation, and decisions were perhaps not always made rationally. It was in this area that I believed I could do a research study.

After having worked all those years as a consultant and manager, I felt I had reached a plateau in my career where there were no new challenges for me in the next few years. I saw myself providing strategic vision and driving large-scale corporate initiatives, but for that I needed the knowledge that could be provided by a formal business education. With this in mind, and also to open up the European economic market for myself, I went to France in 2010 to pursue a master's degree in business administration (MBA). This was a year-long, highly intensive, business management programme in Lyon. Situated in the heart of France, bathed in glorious weather, and with easy access to both the Mediterranean Sea and the French Alps, Lyon was perhaps not the ideal place for making such an intense educational commitment. There was the danger of spending more time outside Lyon than in it. With all these temptations notwithstanding, I completed

the programme on schedule and was awarded my MBA in Strategy in 2011. During the time there I learnt quite a lot about corporate and international strategy, financial management, marketing management, human resource development, entrepreneurship, and corporate social responsibility. The network I acquired as a result of the professors' group, alumni, and students, was priceless. Having now received a formal education in strategy, I wanted to explore this field further and attempt to develop a study where my findings could have a direct impact on firms and internationalisation business processes. I hoped to simplify strategy in firms and to help develop, in my own way, a better process in business decision making. So, to combine this with my fondness for the European way of life I thought about studying for a Ph.D. degree programme in a good school in Europe. I found many good research programmes in various schools in Europe and applied to a few good ones in Germany, Sweden, and France. The Stockholm School of Economics looked promising, with its location, network, research areas, faculty, and corporate links. Also, I had visited Sweden for a week as part of a consulting project I was part of during my MBA programme. I loved what I saw of Stockholm back then, so the memory of that week swayed my decision (I did mention something about perceptions and lack of rationality in decision making). So, in 2013 I arrived in Sweden to spend the next four years of my life in an attempt to provide some meaningful additions to the excellent literature that is already available in the fields of strategy and international business. The Ph.D. is my personal and professional pursuit of excellence.

Why Offshoring?

I have studied offshoring of R&D to explore how the choices made by the decision makers influence how R&D is established offshore and how this, in turn, affects the innovation performed there. This perspective is not very well discussed in current studies and developing new explanations will help understand this relationship somewhat. Offshoring is an international business phenomenon where I have spent many years working as a consultant in offshore technology and project management centres in India delivering Information and Communications Technology (ICT) products and services

for North American and British firms. My consulting expertise also brought with it the experience of working with the drivers, dilemmas and challenges of such engagements. While this was almost entirely in the ICT industry, some of the factors may be similar to other industries where R&D is concerned, as is explained later in this thesis. There is constant pressure on firms to achieve increased efficiencies and profitability improvements in order to develop (and retain) sustainable advantages. This leads to decision makers exploring new or different strategies in an effort to achieve these advantages, and the decision making behind many of these strategic choices are complex and often quite individually motivated. Offshoring is one such strategy where decision makers of the firms attempt to find and develop such advantages.

To provide a little background of offshoring, the practice of relocating some parts of business abroad has existed for a long time but it is unclear when *'offshoring'* appeared as business terminology. Offshoring has been a business strategy for several years and has been seen as new managerial practice with its origins possibly in the late seventies (Lewin & Peeters, 2006). The relocation of parts of firms' value chains from their home countries to foreign locations has been an important strategic decision for many companies in order to remain competitive in a globally dispersed marketplace. Global sourcing now comprises three different activities – manufacturing, information technology and business processes (Roza, Van den Bosch, & Volberda, 2011). In the search for talent, however, firms have now started considering offshoring innovation as a viable business strategy (Lewin, Massini, & Peeters, 2009). To indicate the relevance of my study, firms have also traditionally been on a continuous search to seek out cost and efficiency gains and offshoring those activities that can help attain a suitable competitive advantage. As such, research and development (R&D) offshoring is not new and has classically considered both the arrangements of vertical integration and vertical disintegration commonly known as the *'make-or-buy'* decision (Lambertini & Rossini, 2008; Olausson, Magnusson, & Lakemond, 2009; Pinheiro & Sarmento, 2013). Recent R&D literature discusses the actions firms take to create knowledge rather than just to transfer or leverage it. As a result, a lot of foreign direct investment (FDI) made by firms, fall into either exploiting their capabilities in foreign markets

to adapt to them or for increasing their own knowledge base. These are called home-base exploiting (HBE) or home-base augmenting (HBA) R&D strategies respectively (Dunning & Narula, 1995; Kuemmerle, 1999; Patel & Vega, 1999), or to a more recent evolution to home-base replacing (HBR) innovation capability (Lewin et al., 2009).

Over the course of my work experience, an observation I have made is that firms are inanimate objects that are incapable of thought. Firms do not make decisions, people do and these decisions may not have been adequately evaluated but could have been based on perceptions of trends, personal biases, and competitor logic. Because we have still not evolved into a *cyborg*[1] state of being (will we ever, I wonder?), we sometimes lose rationality during decision making. This could lead to selecting choices that are not grounded in some theoretical framework. Hence, decisions can be poorly evaluated and thus sub-optimal. Even though many decisions are taken based on partial information, what is interesting is the evaluation process of the decisions. I have been guilty of having made decisions using the tacit knowledge I acquired from experience combined with my 'gut' feeling. Hindsight is 20/20, as the cliché goes, but perhaps I could have chosen better with a more systematic approach and unbiased thinking. A theoretically well-grounded decision does not in any way guarantee success, owing to the nature of the business phenomenon; it might, however, reduce the probabilities of failure. Although many companies remain cautious about moving their R&D facilities abroad, many global organisations are seizing the opportunity to set up research facilities in China, India, and other emerging and fast-growing economies. The potential benefits are quite well researched: a vast pool of high quality, low-cost technical talent; increased access to foreign markets; faster development times; and improved overall R&D productivity. There are also many disadvantages associated with offshoring. I have encountered some of these from my own professional experience, and they had proven to be difficult to resolve; visible ones such as currency fluctuations, agency, institutional, and legal expenses, and the in-

[1] Cyborg is short for "Cybernetic Organism", a theoretical being with both organic and biomechanical body parts. The term was coined by Manfred E. Clynes and Nathan S. Kline of Rockland State Hospital, New York and refers to an organism capable of perfectly logical and rational thought and action. The concept found its way into popular culture with the highly successful Terminator film franchise.

visible costs associated with knowledge and resource transfers. Exposure to risk increases with offshoring as does the loss of management control. With the pros and cons of offshoring in mind, I was interested to know more about why there is R&D offshoring and what the outcomes of this are, in terms of innovation.

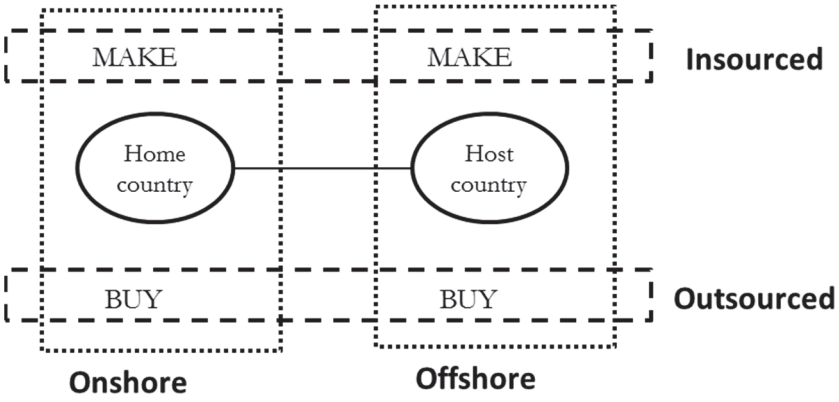
This thesis explores the offshoring of research and development using Swedish firms in India as the sample. In the empirical setting, considering that India is not traditionally renowned for its R&D capability or innovation efficiency and Sweden ranks very high[2], does this matter in how R&D is performed in India considering that there may be differences in competencies or other factors? It may be that this difference manifests in certain dissimilarities in capabilities between Sweden and India. I wanted to understand why the decision makers perceive it necessary to take their firm abroad for some of their R&D activities, how R&D is setup offshore, and how they justify their decisions. I explore the offshoring of R&D by talking to the decision makers who were directly involved in the decisions, or those who had a close association with the decision making. Aharoni, Tihanyi, & Connelly (2011) discuss decision making and international business over a forty-five-year retrospective and assert that decision making heuristics and biases likely vary between multi-national enterprise (MNE) managers in different countries. My thesis investigates how decision making varies within and across firms, and how decision makers may have been influenced by their individual motivations, their experiences, and their surroundings. My thesis also explores the outcome of the offshore R&D setup, which is the innovation arising out of the R&D arrangement, and how this may have been affected by the choices made by the decision makers.

I differentiate between 'offshoring' and 'outsourcing' because they can sometimes mean the same thing. In my thesis outsourcing refers to the decision to buy products or services previously produced internally from another (domestic or offshore) company whereas offshoring refers to a domestic company obtaining services from a foreign-based company, be that a subsidiary (captive or international in-sourcing) or an independent

[2] According to the European Innovation Scoreboard, which provides a comparative analysis of innovation performance in EU countries, Sweden was named as Europe's most innovative country in 2016. This press release can be accessed via http://europa.eu/rapid/press-release_IP-16-2486_en.htm

service provider (offshore outsourcing) (Massini & Miozzo, 2012). In my thesis, the offshoring scenarios include the 'make-buy' and in some cases 'ally' decisions while choosing between producing internally and sourcing from an external provider. Wherever it is used in this thesis, 'insourcing' is defined as the decision to deliver a service or product in-house either in the home country or from a wholly owned foreign subsidiary. A 'captive centre' is a wholly-owned subsidiary in a foreign location, of a parent company and whose services or products are available only to the parent firm (Oshri, Kotlarsky, & Willcocks, 2011). This thesis considers the 'offshore' block (which includes both the 'make' and 'buy' decisions) shown in my elaboration in figure 1.

Figure 1: Sourcing matrix



R&D and Innovation

Although Research and Development (R&D) has existed as an activity for a long time there doesn't appear to be an agreement on the definition of R&D. What it means or what it comprises is still not completely clear. The idea of 'systematicity' as the centre of most definitions of R&D is discussed by Godin (2001). He went on to suggest that an organised, formal, and continuous activity is the central theme in most definitions of research. OECD international standards on R&D exist and are specified in the OECD Frascati manual (2002). The OECD manual also mentions 'system-

atic' as a key term in its definition, where R&D is creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications[3]. The manual suggests both laboratory and industrialised research, and distinguishes between continuous R&D which is R&D carried out in units attached to establishments or in central units, and ad hoc R&D which is R&D carried out on an operational part of a business. The Frascati manual describes two elements of R&D: one carried out in formal R&D departments, the other of an informal nature carried out in units for which it is not the central activity. In my thesis, I consider R&D as investments in applied research or basic/fundamental research or both. Basic research is pure R&D research. I consider applied research as research in 'Design, development, and testing (DDT)' and manufacturing (Castelli & Castellani, 2013). These two types of research will, therefore, include the activities in any part of the value chain, in any industry. In my thesis, I consider R&D as the activities for new products, new services, new methods of production and new ways of organising performed in centres that are dedicated R&D units or centres for which R&D is part of the activity of the unit. The activities are thus systematic, institutionalised, and continuous. However, the important thing is that I was interested in the viewpoints of the decision makers for what they believed constituted the firm's R&D. After the establishment of R&D, the outcome of the R&D centres, in terms of the resulting innovation, is another interesting opportunity that I explore in my thesis.

There have been many studies on innovation, innovation theory and innovation management. Most of the studies explore innovation in terms of newness. Innovation is not always restricted to conventional research and development (R&D) production and is a little difficult to define. OECD/Eurostat's 2005 edition of the Oslo Manual[4] defines innovation as new developments in the product, process, marketing and organisation functions. Studying, for example, the sources of innovation and innovation

[3] OECD (2002), *Frascati Manual 2002: Proposed Standard Practice for Surveys on Research and Experimental Development*, The Measurement of Scientific and Technological Activities, OECD Publishing, Paris: p. 30.

[4] This is OECD Eurostat's definition of innovation for European purposes. The link is provided as: https://www.oecd.org/site/innovationstrategy/defininginnovation.htm

drivers, there are some typologies of variables to consider when discussing innovation. R&D performed in-house, R&D acquired outside, acquisition of know-how, and acquisition of machinery and design are all sources of innovation while cost reducing opportunities, technical opportunities, and market opportunities are cited as the major drivers for innovation (Filippetti, 2011). Innovation has been categorised in terms of what was new and whom it was new for (Johannessen, Olsen, & Lumpkin, 2001). They investigated the six different innovation activities that were first introduced by Schumpeter (1934) and then came up with 'newness' as the common denominator of innovation. The six activities discussed are: new products, new services, new methods of production, opening new markets, new sources of supply, and new ways of organising. Other definitions use knowledge as the source of innovation and its appropriation as innovation. Innovation is discussed as the application of knowledge to create new knowledge (Drucker, 1993) and the transformation of information to knowledge (Johannessen, Olsen, & Olaisen, 1999) although their study considers this only for organisational innovation. Jones (2009) discussed innovation by putting an innovator and a stock of knowledge as the centre of innovation. The motivation and the management of innovation are emerging as part of decision making, and hence it involves some sort of transformation. All knowledge innovation is the basis for a firm's competitive advantage (Sveiby, 1997). It is critical how one allocates control over the R&D process (Aghion & Tirole, 1994) and to understand the connection between technical and administrative dimensions of innovations is a key management strategy to managing innovation (Van de Ven, Andrew H, 1986). Strategically motivating innovation (Manso, 2011) and managing the perspectives of innovation on the problems confronting decision makers and how they are addressed (Lewin & Minton, 1986) is interesting in the context of this study. Most of the definitions suggest the concept of newness, a stock of knowledge and some kind of transformation of this as innovation. In my thesis, the innovation outcomes that emerge from the R&D centres offshore are explored as some form of newness, with the firm's decision maker influencing how this is produced.

Purpose, Research Questions, and Contribution

This thesis aims to provide some insight into what decision makers see when they look at their firms, in the context of R&D offshoring, and how that results in certain R&D arrangements offshore. I study decision makers both as individuals and as groups. The fact that the viewpoints of the decision makers may differ from one another in the same firm or across firms is particularly interesting because it may indicate how certain attributes of the firm or the decision makers can influence their choices.

> *The purpose of this study is to seek answers to how various factors influence the decision makers during the R&D offshoring process, and how in-turn they affect the offshoring of the firm's R&D.*

Before examining R&D offshoring, I had reviewed literature on IT offshoring, which I chose as a suitable starting point because of my previous experience in several offshored IT engagements, and to confirm my initial curiosity about such moves. In trying to explore R&D offshoring, this thesis attempts to uncover how offshore R&D is configured, and what innovation outcomes emerge from this. How the decision makers influence this process is also what the thesis attempts to develop. To seek these explanations, I will endeavour to answer the following overarching question:

> *How do decision makers affect organisational R&D offshoring?*

In order to answer this question, I will attempt to respond to three sub-questions:

> *RQ1: How is the offshored R&D configured?*

The study of R&D configurations is not well researched yet. G. E. Hall & Loucks (1978) were among the first to talk about configurations when discussing R&D. Analysing the adaptations of R&D they proposed that any one setup can have several different operational forms or innovation con-

figurations and each component can be varied or adapted. Discussing the arrangements of the internationalisation of R&D, Chiesa (1996) developed R&D arrangements in terms of experimentation structures and exploitation structures. In this thesis, I develop the concept of an R&D configuration which is how R&D is arranged, in this case offshore, in terms of what is being produced, the intention of this production, and the resultant innovation outcome. No previous study, to the best of my knowledge, has explained R&D configurations in this way.

RQ2: How do the decision makers affect the set-up and the outcome of the R&D configuration?

During decision making there is a tendency for the group of decision makers of a firm to override realistic appraisals of the situation and this leads to a lack of criticism in the decision making group (Postmes, Spears, & Cihangir, 2001). Decision makers tend to rely on heuristics and personal experiences rather than on systematic or algorithmic strategies during decision making (Klein, 2008) and this leads to people using their experiences as a means of justification according to the patterns they observed from past learnings. I wanted to know how the arrangement and outcome of the offshore R&D is affected, based on what factors influence the decision makers. In this thesis, this will be answered by drawing focus on a specific part of the decision process.

RQ3: How do the attributes of the firm and the decision maker influence within-firm and inter-firm differences?

Decision makers use subjectivities such as age, education, background and experiences to make decisions (Hambrick & Mason, 1984). A given stimulus could be interpreted differently by decision makers in different organisations or sometimes even in the same organisation (Dean & Sharfman, 1993; Dutton, 1993; Haley & Stumpf, 1989). I am interested to know the effect individual or group variations can have in the decision making process. By answering this question, this thesis will attempt to uncover how the viewpoints of the decision makers may converge or diverge within or

across firms, depending on the characteristics of the firms and the decision makers themselves.

The audience of this study is meant to be academics and scholars in the IB and strategy fields, and practitioners within the management or engineering field of any technology intensive company. Those individuals who make offshoring decisions on their firms' behalf may be particularly interested in the findings of this research. Academics may find interesting why certain types of firms are configured to perform R&D in certain ways and how this might vary for different kinds of firms. The influence the decision makers have on the intricacies of the offshored R&D is potentially interesting for academics especially in terms of how they may vary. What scholars and business students may find helpful is the impact the decision maker has on the R&D arrangements and the innovation that emerges from these arrangements, along with the subsequent progress of innovation.

By expanding the knowledge of how decision makers influence how offshore R&D is configured and how the resulting innovation is affected, this thesis seeks to contribute to international business and strategic management.

Outline of the Thesis

This thesis is a monograph and is written in a simple, structured manner which is intentionally made easy to read, irrespective of the audience. Chapter 2 provides the context of this study by introducing some history of Swedish industry presence in India and why the differences between Sweden and India are interesting in the case of R&D offshoring. Chapter 3 describes the theoretical framework which serves as the foundation of this study and helps to address my research questions. In this chapter, I review international business and strategic management research for how decision makers affect R&D offshoring, and based on that I identify interesting gaps that I explore further in this thesis. In order to answer the research questions, I use a case study approach with a qualitative analysis of qualitative data. This approach is covered in detail in chapter 4. The data came from interviews with 25 decision makers from a total of 10 firms. These are a mixture of large and small firms from the technology and manufacturing

sectors. This chapter also explains the process of theorising which elaborates how I went from the data to the development of theory. In chapter 5, I provide narratives of what the decision makers revealed about the R&D offshoring, the decisions that were taken, what motivated them to do so, and some of their personal views as well. This is done for each of the 10 firms, and every firm's story ends with a table comprising the main keywords and messages that emerged from the interviews. The cross-case analysis of the study is explained in chapter 6 where the research questions are attended to in detail. In this chapter the findings are also presented, which form the basis for the contributions of this thesis. Chapter 7 brings it all together by explaining the contributions to both theory and practice. In chapter 8, I present some thoughts into what this thesis does not explore and also provide new opportunities for further research avenues. Lastly, in the appendix, I provide the interview guideline on which I generally based my questions. I also present a hand-drawn one page illustration, which I hope will summarise this thesis.

2. THE SETTING: SWEDEN IN INDIA

> "To boldly go where many men have gone before." (with sincere apologies to the entire crew of the original Star Trek television series)

Chapter Summary: A short history of Swedish industry in India is described here to present some introduction to the context of this study, and why it is an interesting setting. Presented in this chapter are also some of the past milestones, growth rates and trends of Swedish industry in India to motivate the current relevance.

Historically trade between Sweden and India started with the establishment in Gothenburg in 1731 of The Swedish East India Company[5], for conducting trade with India and the Far East. This company was inspired by the success of The Dutch East India Company and The British East India Company and it subsequently became the largest trading company in Sweden during the 18th century until it closed in 1813. However, in modern times official ties between India and Sweden were established in 1949 and are founded on shared democratic values. High-level contacts between the two countries go back to 1957[6]. Commercially, however, trade has preceded India's independence. Ericsson supplied its first manual switchboard to India in 1903. In 1920, Swedish Match set-up its first factory there. Many Swedish multinational companies have manufacturing plants in India. ABB, Volvo Trucks, Astra Zeneca, Ericsson, Atlas Copco, Sandvik and SKF, just

[5] This information is from the Svenska Ostindiska Companiet (the Swedish East India Company) website. This company was established in 1731 and was Sweden's most famous brand. More information can be accessed via the link http://www.soic.se/en/our-story/the-swedish-east-india-company-soic/

[6] This is according to the information published by India's Ministry of External Affairs' foreign relations brief on Sweden. Details of the report can be accessed via the link provided here: https://www.mea.gov.in/Portal/ForeignRelation/Bilateral_Brief_on_Sweden_as_on_December_2__2016.pdf

to name a few, have a strong presence. In recent years, several of these companies have also grown significant R&D operations in India. By 2011, some 140 Swedish companies had established operations in India. The presence of Swedish firms in India varies from large firms such as ABB and Ericsson who each has almost 9000 employees in their Indian divisions, to small firms such as Appendit that has 20 of its 25 employees based in India, or Andante that has 3 of its 5 total employees based in India. Swedish ownership percentages in India also vary from partly owned units for ABB (52.1% share) to fully owned subsidiaries such as those of Ericsson and Oriflame[7]. A sample of the Swedish presence in India is shown in my elaboration in table 1. However, these do not necessarily mean that these firms have R&D or product development labs.

Table 1: A sample of Swedish firms in India

%age[8]	Name	Firm size (worldwide)	(India)	Industry
100	Appendit	25	20	Mobile applications
88.7	Alfa Laval	12,078	1,247	Pharmaceuticals
100	Elof Hansson	500	37	Paper & Pulp
100	Ericsson	90,732	7,887	Mobile technology
90	Astra Zeneca	65,000	1,759	Pharmaceuticals
10	Purcell	178	4	Power systems
100	Oriflame	8,000	450	Cosmetics
100	IKEA	127,000	140	Furnishings
49	Securitas	280,000	20,000	Security Systems
53.5	SKF	44,742	2,107	Engineering
18.9	Stora Enso	26,000	7	Paper & Pulp
28	Tieto	18,000	1,624	IT Services
100	TetraPak	22,000	495	Packaging

[7] This is available at Sweden Abroad's website, which is an iniative that allows anyone to access business and some administrative information about Swedish firms and interests abroad. This report can be accessed via: http://www.swedenabroad.com/ImageVaultFiles/id_537/cf_52/SIBG_2011_2012.PDF

[8] This is the percentage of Swedish ownership of the Indian facility.

For Swedish multinational enterprises, if R&D expenditure and employment abroad is considered, then significant trends can be observed. According to the analysis done by The Swedish Agency for Growth Policy Analysis[9], the USA is the leading destination for Swedish R&D, both in terms of R&D investment and in number of employees. As table 2 shows, lower-income countries such as India have experienced a sharp increase in both these numbers although the proportion of R&D is lower than the corresponding proportion for employment.

Table 2: A sample of Swedish R&D expenditure and employment abroad

	R&D Expenditure (SEK million)		**Employment**	
Country	**2011**	**1997**	**2011**	**1997**
USA	6523	5034	190115	94837
China	3896	2	71257	8847
France	2532	477	64145	38422
Germany	2432	1866	98373	71724
Italy	2065	993	26036	33058
Finland	974	491	48306	24538
India	881	30	33820	8338
Brazil	665	332	34325	18426
United Kingdom	625	2276	64423	55286

Source: Adapted from The Swedish Agency for Growth Policy Analysis report

There are several studies made in the Indian or emerging economies context. Most studies discuss offshore outsourcing to India on an aggregate level, but some adopt an activity-based perspective using the operational process as the frame of reference between firms located in high-cost countries and their service providers in India (Jensen, 2012). In the context of Swedish offshoring to India, there isn't much literature that explores the

[9] The Swedish Agency for Growth Policy Analysis or Tillväxtanalys (www.tillvaxtanalys.se) is commissioned by the Swedish Government to evaluate and analyse Swedish industry growth policy.

decision making process. There is quite a difference in organisational cultures between Sweden and India (Koch, 2013) and their impact on the management of and cooperation within distributed teams (Salminen-Karlsson, 2013). Furthermore, based on the Scandinavian employees' positive experiences in India and the flexibility of thought in India, what often begins as a single project leads to a collaborative or a strategic transformation of the Scandinavian firm (Koch, 2013).

Given this history and recent background of rapid growth, the offshoring experience of Swedish firms in India presented itself as an interesting study. India has traditionally been as a centre of excellence for the ICT and ICT related industries[10] but has not been seen as a centre of expertise for R&D activity and specifically R&D in the manufacturing sector. Considering this situation, and Sweden's known expertise in sophisticated manufacturing R&D, this was an interesting opportunity for explore. To understand why a firm from a country with very sensitive quality and innovation benchmarks would offshore research activities to a country not known for those, motivated me to explore this further. Not much has been discussed about the viewpoints of the decision makers on the offshoring of R&D processes of Swedish firms to India. While these appear to be a lesser researched areas in this particular setting, intuitively there may be some similarities with other cases, for example, the traditional offshoring from British and American firms to India. However, business models and management styles could be different in Sweden owing to the particularly well-developed industry environment that promotes one of the highest innovation rates and R&D intensive work in the world. For me, this setting was an opportunity to try to explore whether the differences between Swedish and Indian understandings of quality, capability, and knowledge lead to interesting arrangements of R&D and innovation outcomes. My Indian background and previous work in offshore engagements helped in this thesis because it brought with it some implicit knowledge of offshoring to India, while getting access to the Swedish firms was easier because I was in Sweden.

[10] AT Kearney's 2016 Global Services Location Index (GSLI) research paper that analyses and ranks the top 55 countries for outsourcing worldwide, based on metrics in three categories: financial attractiveness, people skills and availability, and business environment, ranked India as the world's largest destination for offshored technology and services functions.

3. THEORETICAL FRAMEWORK

> "If the facts don't fit the theory, change the facts." (Albert Einstein - theoretical physicist, Nobel laureate)

Chapter Summary: For this thesis, I used research from the international business and strategic management streams. From international business, I reviewed research related to offshoring, R&D offshoring, and the relationship with innovation. In strategic management, I reviewed research concerned with decision theory and capabilities. From the theories, I uncovered some gaps that relate to how decision makers viewed and used their firm's capabilities to make decisions to offshore R&D. There was also a gap in how the offshored R&D affected the type of innovation that resulted from such centres. In this chapter, I raise research questions that seek to attend to these gaps. How my questions seek to contribute to theory is described in this chapter.

International Business

The setting of this thesis is in international business, of which the phenomenon of R&D offshoring is a part, where a part of the firm's value chain – in this case, R&D - is performed outside the home country in order to seek out some sort of strategic benefit.

Internationalisation: Going Abroad

Though possibly not internationalisation in the form we know it today, the first proponent of 'international trade' and having production outside the borders was arguably the Scottish moral philosopher and political economist, Adam Smith, who in his 1776 classic 'An Inquiry into the Nature and Causes of the Wealth of Nations', first described the principle of 'absolute

advantage' using labour as the only condition. He proposed that a country should export commodities in which it possessed an absolute advantage in. Influenced by Adam Smith's work, the English political economist, David Ricardo, in his seminal work "On the Principles of Political Economy and Taxation" in 1817 brought the idea of 'comparative advantage' asserts that gains from trade for firms and nations arise from the differences in their factor characteristics and technological prowess. This rather than absolute advantage is responsible for much of international trade and can explain some of the free trade movements of today. One of the earlier modern works on international investment recommended searching for international locations based on the product lifecycle (Vernon, 1966). This product lifecycle method was, however, a discussion only for USA based firms to look for economies of scale by producing from foreign countries. The author suggests that this approach is only for mature and standardised products, so the article does not consider businesses in other stages in the lifecycle. Also, at the time the article was written the differences in economic indicators between the USA and even Western European countries was quite wide, so these recommendations are perhaps not as relevant today but still provide an early insight into international relocation of production.

According to internationalisation theory, firms will cross international borders as they see fit to develop and deploy resources to take advantage of knowledge and capabilities (Buckley & Casson, 1976). There are generally two philosophies or schools of internationalisation. The first is the economic view which answers the question of why internationalisation happens. The OLI framework (Dunning, 1980) suggests that firms will strategically invest internationally to seek out ownership, location and internalisation advantages. The OLI framework used industrial patterns and geographical distribution of sales from US affiliates in fourteen industries in seven countries but this framework proposes only offshoring via captive centres. Though this original work dates from the 70s, a lot of the reasons are still valid today. Arguing for offshoring as a strategy for internationalisation, Doh (2005) proposes that for many firms offshoring is intrinsic to their business model and their strategies confirm these theories of internationalisation. The second major view is the behavioural school of internationalisation led by the Uppsala model which was developed by Johanson

& Vahlne (1977). They proposed that internationalisation is a series of sequential increments where market knowledge and market commitment at a certain point in time affect the commitment decisions at subsequent stages in the process. The Uppsala model was founded on organisational learning and knowledge acquisition. The model answers the question of how internationalisation happens and explores how firms operate in a market where they lack knowledge. Neither the OLI framework nor the Uppsala model, however, discusses how dynamic capabilities and the involvement of the decision makers affect internationalisation decisions.

Other IB traditions combine the parts of the above schools or extend the theories further. The DLE paradigm (Disintegration–Location–Externalization) proposed by Kedia & Mukherjee (2009) is based on Dunning's work and discusses the advantages sought by disaggregating the value chain thereby seeking the advantages achieved of down-sizing and modularity. Their framework is different from Dunning's in that they champion the benefits associated with external vendors in obtaining cost reduction and in tapping into supplier related capabilities. This DLE model is, however, mainly a proponent for offshore outsourcing. In another recent development, Mathews (2006) discusses a different approach that challenges the OLI framework. He presents a new LLL framework (Linkage-Leverage-Learning) where he suggests building networks (links) to access resources abroad, then leveraging these resources to secure strategic advantages. Together these two facilities accelerate international expansion and repeated applications of linking and leverage may result in the firm learning. While this is a departure from the traditional IB theories, it is only applicable to newcomers or late-comer firms and only for firms from emerging economies that invest in developed countries. This framework is thus a model for challenger firms to grow internationally without the resources, skills, and knowledge that incumbent firms from developed economies possess. The IB models discussed are summarised in table 3 to provide the core themes of each. Each model is compared to highlight the primary drivers they are motivated by.

Table 3: Core IB literature

Framework/ model	Author(s)	Core themes
Product lifecycle	Vernon (1966)	Seeking economies of scale Applies to Standardised product only.
Uppsala	Johanson, Vahlne (1977)	Learning and market commitment. Answer the questions of how to internationalise.
OLI	Dunning (1980)	Ownership and captive offshoring. Answers the questions of why to internationalise.
LLL	Mathews (2006)	Emerging country MNCs. Internationalisation without adequate resources, skills, or knowledge.
DLE	Kedia, Mukherjee (2009)	Disaggregating the value chain. Seeking supplier capabilities.

Core IB theories discuss captive offshoring, and disagregating value chains to international locations as strategies for internationlisation. R&D activities are crucial functions of an organisation and form an important part of a firm's value chain, and as suggested, there are reasons to disaggregate this and perform part of the activity in an international location. While R&D offshoring as a strategy for internationalisation explains the core of this research in terms of the motivations, the part my thesis seeks to contribute to, is arrangement of offshore R&D and the decision making process in the internationalisation of R&D with Swedish firms as empirical case.

I chose to begin with a review of IT offshoring because I had several years of expertise and previous knowledge in this field and this gave me a familiar start. Lacity, Khan, & Willcocks (2009) examined 18 years of research and addressed questions on the strategic intent and the effect of IT outsourcing, and found cost reduction, focus on core capabilities, access to expertise/skills, improving business/process performance, and gaining leading technologies as the most frequently discussed reasons. Håkanson & Nobel (1993) studied 150 foreign R&D establishments of 20 largest Swedish manufacturing firms to determine the nature of the work performed in the overseas units and the factors that led to these firms relocating this work outside Sweden. They classified the motivations of going abroad based on the typology of the foreign R&D units segregated into market

orientated units, production support units, pure research units, political units and multi-motive units. Martinez-Noya, Garcia-Canal, & Guillen (2012) combine streams of outsourcing and offshoring literature and develop how technology-intensive firms choose their R&D outsourcing strategy, as shown in the adaptation in table 4. Granstrand (1999) developed a model of R&D internationalisation using a sample of Swedish and Japanese firms and determined the driving and inhibiting forces behind R&D internationalisation of Swedish multinationals, as shown in the adaptation in table 5.

Table 4: Firms' characteristics and motives for R&D outsourcing

FIRMS' CHARACTERISTICS	**FIRMS' MOTIVES**
Need and ability to tap external global resources	***Resource gap***
• Technological resources and capabilities	• Knowledge seeking motivation
• International experience	• Lower cost seeking motivation

Source: Adapted from Martinez-Noya et al. (2012)

Table 5: Driving and inhibiting forces behind Swedish corporations' R&D internationalisation

Driving forces
a. Supporting local production, customers or markets
b. Creating access to foreign science and technology
c. Creating better access to cost effective supply of R&D personnel
d. Local ambitions among subsidiaries
e. Local government regulations
f. Foreign acquisitions
Inhibiting forces
a. Need for close supervision and control of R&D
b. Risk of leakage of information
c. Need to have R&D close to domestic market
d. Economies of scale in R&D
e. Costs of coordination and communication
f. Government policies

Source: Adapted from Granstrand (1999)

Discussing the relationship between competences and the global innovation networks in the Swedish ICT industry, Chaminade & De Fuentes (2012) used regression analysis on Swedish firms and confirmed that firm-level competences (defined as human capital and R&D activity) are an important enabler for the globalisation of innovation, while competences accumulated in the host region (defined as host competencies and region's economic tier) are an important driver for the globalisation of innovation.

Roza-van Vuren (2011) developed a study discussing a multi-dimensional view of R&D offshoring strategies and relating them to firm sizes, though specific to Dutch firms. Ambos & Ambos (2011) studied the firm and location-specific factors to explain the challenges of offshoring R&D. In locating knowledge activities according to home country advantages or according to host country strengths, Patel & Vega (1999) and Bas & Sierra (2002) discuss results on the location strategies of multinationals where they analyse technology-seeking FDI, home-base-exploiting FDI, home-base-augmenting FDI, and market-seeking FDI in R&D as the four major strategies motivating the location choices. Their articles further discuss how, historically US, Japanese or European based firms choose different types of strategies for relocating their R&D. R&D has been increasingly outsourced or offshored (Demirbag & Glaister, 2010; Doh, 2005; Jahns, Hartmann, & Bals, 2006; Weigelt, 2009) but the gains of the outsourcing need to be balanced against the pains that emerge from any loss of capabilities (Grimpe & Kaiser, 2010). R&D internationalisation can bring about the acquisition of firm-specific resources which is a competitive advantage (Wang, He, & Mahoney, 2009) that leads to new organisational capabilities (Kale & Singh, 2007; Slater, Olson, & Hult, 2006) but this acquisition of external knowledge can negatively affect the firm's integrative capabilities (Helfat & Raubitschek, 2000; Weigelt, 2009) while firms may outsource too much in search of innovation outcomes (Katila & Ahuja, 2002; Laursen & Salter, 2006). Why firms choose to internationalise R&D is also motivated by knowledge, market or efficiency seeking drivers (Granstrand, Håkanson, & Sjölander, 1993), where either demand-orientated or supply-orientated forces for innovation decentralisation outweigh the need for companies to protect their firm-specific or proprietary technology. Carlsson (2006) suggested that the innovation activities themselves are increasingly being inter-

nationalised and most studies still deal with the generation of innovation and only a few discuss the diffusion of innovation.

Several studies have linked R&D internationalisation and innovation outcomes, with some results validating the role of R&D internationalisation in stimulating innovation (Hsu, Lien, & Chen, 2015) while some others attribute R&D internationalisation as facilitating and diffusing innovation to create competitive advantages in international markets (Cantwell & Mudambi, 2005; Cantwell & Zhang, 2006; Kafouros, Buckley, Sharp, & Wang, 2008). Nieto & Rodríguez (2011) suggested that R&D internationalisation leads to different innovation outcomes by acquiring access to exceptional talent (Couto, Mani, Sehgal, Lewin, Manning, & Russel, 2008; Kedia & Mukherjee, 2009; Lewin et al., 2009) or new knowledge and technology (Maskell, Pedersen, Petersen, & Dick - Nielsen, 2007). Internationalisation and innovation have both been suggested as growth strategies (Brock & Yaffe, 2008; Kyläheiko, Jantunen, Puumalainen, Saarenketo, & Tuppura, 2011) and not all firms have been able to create value from their research abroad (Kafouros et al., 2008). Discussing the configurations of the internationalisation of R&D, Chiesa (1996) suggested R&D as experimentation structures and exploitation configurations. Discussing R&D and what it leads to, Tseng, Kuo, & Chou (2008) developed a schema and found four configurations: overall innovation, focus on organisational innovation, low participative and cooperative innovation, and less innovation. There are other studies done where configurations are based on performance effects of project-based configuration, mass customization configuration, cellular configuration, and organic-technical configuration (Tidd & Hull, 2002) or on activity based configuration for value-based modes of R&D, technology-based functional modes, and strategy based modes (Fuglsang & Sundbo, 2005) or on a systems view of innovation where innovation emerges from three critical firm-level factors of posture, propensity and performance (Carayannis & Provance, 2008).

No previous work has discussed how the R&D is observed as a set of capabilities and activities, both as seen by the decision makers, that results in how a firm's R&D is organised offshore. Few studies have explained how R&D is configured offshore from decision makers' choices, and explore a possible link between the R&D configuration and how progress in

innovation is possible in those offshore R&D centres. It is in this somewhat lesser researched area that this thesis discusses how R&D is configured offshore and what kinds of value are derived by such configurations. This thesis seeks to explore and answer how various R&D configurations offshore lead to different innovation outcomes. The research question that is in this area of international business but one that also lies in strategic management, which is attended to in this thesis is:

RQ1: How is the offshored R&D configured?

Strategic Management

The intervention of the decision makers regarding the choices they make, the factors that influence their decisions, and how capabilities are used is a part of strategic management. Strategic management as a field of research has grown over the last few decades but it remains a field that is difficult to define. There is a consensus about the essence of strategic management but ambiguity about what it constitutes (Nag, Hambrick, & Chen, 2007). It could be to leverage the various environments of the firm to maximise utilisation to achieve firm objectives (Bracker, 1980) or it could deal with both formulation and implementation of behaviour in new situations (Van Cauwenbergh & Cool, 1982). Strategic management refers to managerial intervention (Jemison, 1981; Schendel & Cool, 1983), firm performance or success (Edward, Bowman, & Thomas, 2006; Rumelt & Teece, 1994) among others as a unit of analysis. It does, however, overlap with several other fields including economics, finance, marketing, and technology (Hambrick, 2004). In most of these overlapping fields, decision making has emerged as one of the most interesting topics in current strategic management research (Dean & Sharfman, 1996; Eisenhardt & Zbaracki, 1992; Papadakis, Lioukas, & Chambers, 1998).

The role played by capabilities, essentially as seen by the decision maker, is central to this thesis because it will seek to explain how R&D is setup abroad. How decision makers perceive their firm's capabilities and use these to establish a particular R&D configuration provides an addition to existing strategic management knowledge. This thesis also seeks to further

the knowledge of decision making in strategic management by elaborating on how the choices made by and the attributes of the decision makers influence the way R&D is set-up and the resultant innovation that emerges from it.

Capabilities: What Decision Makers See

The reasons for relocating businesses abroad are well researched from three perspectives. The first is the transaction cost economics (TCE) theory that is applied to explain offshoring. Introduced by Coase (1937) and elaborated later by Williamson (1979), this approach assumes low costs at offshore locations to decrease overall costs at the home location. According to TCE, the uncertainty of the market favours bringing assets under firm ownership, and hence the 'make' option becomes more favourable. The drivers here are lower labour and transaction costs that seek to achieve economies of scale. TCE is a macroeconomic factor and has little to do with the firm's internal characteristics. My research looks at TCE for the general hypothesis that firms move overseas to seek out cost advantages and in how certain innovation outcomes emerge from such cost-led R&D motivations. The entrepreneurship theory introduced by Schumpeter (1934) described entrepreneurship as a tactic to try out new combinations, and as later expanded by Davidsson (1989), discussed entrepreneurship as the willingness of firms to grow, explore and stretch its boundaries. Thus, in the context of offshoring strategies, relocating business functions abroad allows the firm to enter a new market and to get closer to potential customers and other growth opportunities. The effect here is to realise new business opportunities. My thesis considers this only from the perspective of the motivations of firms who offshore R&D for growth opportunities.

The resource-based view (RBV) (Barney, 1991; Penrose, 1995) that considers competences and 'rare' resources as the primary drivers in searching for offshore locations is important in this thesis because one of motivations decision makers may use to justify their decisions is the presence of such capabilities. How decision makers view their own firms or resources while making decision choices is a study of capabilities. This theory looks at firm competencies and assumes that resources are inimitable and difficult to substitute. Thus, the firm can increase its performance by efficiently us-

ing its resources. With this view, offshoring is caused by the availability of qualified personnel and capabilities at offshore locations (Lewin & Peeters, 2006). The intent here is to improve the efficiency of operations. Wernerfelt (1984) asserted that for a firm, resources and products are two sides of the same coin, and he used his analysis to discuss, from a resource perspective, diversification strategies for entry into new markets or for firm acquisitions. In a slight departure from the earlier focus of the strategy perspective, the Teece & Pisano (1994) article asserted that the source of competitive advantage of firms in the resource-based strategy is 'dynamic capabilities'. This emphasised two key aspects that were new to strategic management at that time. 'Dynamic' was the shifting character of the environment where strategic responses were necessary for market and timing conditions, and 'capabilities' referred to the appropriation of adapting in the firm's internal and external skills, resources, and technologies to this changing environment. The RBV is an established force in strategic management but the extent to which the RBV is likely to enrich strategy literature depends on the degree to which it becomes a theory of competitive advantage (Priem & Butler, 2001). To summarise the discussion on capabilities, deciding what type of resource is what type of capability is still a difficult question to answer (Azadegan et al., 2008).

The steady state nature of capabilities or static capabilities is generally the source of competitive advantage because it is valued, rare and non-substitutable (Barney, 1991; Wernerfelt, 1984) while the dynamic paradigm is evolutionary and is enhanced through learning (Eisenhardt & Martin, 2000; Teece & Pisano, 1994). In another perspective using a knowledge management focus, the link between operational capabilities and dynamic capabilities was untangled and clarified (Cepeda & Vera, 2007; Helfat & Winter, 2011). Operational capabilities enable a firm to make a living in the present while dynamic capabilities allow a firm to alter how it makes a living (Helfat & Peteraf, 2003; Winter, 2003) or as the difference between zero-order and first-order capabilities (Winter, 2003; Zollo & Winter, 2002). As a simple practical example, dynamic capabilities allow a firm to engage in research and development (R&D) to fine-tune their operational capabilities for manufacturing (Helfat & Winter, 2011).

A summary of the various ideas from some of the relevant studies is presented in my elaboration in table 6.

Table 6: Types of capability

Theme	**Developer(s)**	**Central concept**
How a firm earns its living	(Helfat & Peteraf, 2003; Winter, 2003)	Operational capability
How a firm changes its operational routines	(Helfat & Peteraf, 2003; Winter, 2003)	Dynamic capability
Zero-order capabilities	(Winter, 2003)	Operational capability
First-order capabilities	(Winter, 2003)	Dynamic capability
Capability transformation from founding to maturity	(Helfat & Peteraf, 2003)	Dynamic capability
Learned and stable pattern of collective activity	(Zollo & Winter, 2002)	Dynamic capability
Steady state view of the firm	(Penrose, 1995)	Static capability
Resources are rare, valueable and inimitable	(Barney, 1991; Wernerfelt, 1984)	Static capability
Evolutionary and enhanced through learning	(Eisenhardt & Martin, 2000; Teece & Pisano, 1994)	Dynamic capability

Decision makers in the firms might perceive their firms quite differently from one other, and there is a lack of research on individual perceptions. How decision makers use their views in decision making is a somewhat fuzzy area of research. How the decision makers use their understanding of what constitutes capability within their firms and then use these to set-up the firm's R&D offshore is an area that has not been studied well. How firms organise their R&D offshore is partly dependent on the capabilities the firm possesses. Subsequently, when the R&D is established offshore, the resultant innovation is again dependent to an extent on the capabilities the firm possesses and how they are used. The gap in capabilities that may exist between the home and offshore location can lead to different arrangements of R&D. How decision makers utilise capabilities, and the gaps in capabilities that may exist are explored further, and help to build a few of

the propositions that seek to explain a part of the process that is developed in this thesis.

Decision Theory: What Decision Makers Do

Offshoring of R&D, like any internationalization, relies on the decision making abilities within the firm; these abilities comprise people, processes, and technology systems. Decision theory is an interdisciplinary science and is one of the fundamentals in the field of strategy. Decision theories are either normative or descriptive. A normative decision theory is about how decisions should be made, and a descriptive theory is about how decisions are actually made (Hansson, 1994). This thesis is about how a decision maker actually makes decisions for offshoring, so this is descriptive decision theory.

There doesn't appear to be a consensus on where the starting point is for the discussions around decision making. Perhaps the first modern treatise of decision theory was provided in 1910 by John Dewey who proposed suggestion, intellectualisation of a difficulty into a problem, development of hypotheses, mental elaboration of these, and hypotheses testing as five phases of thought (Dewey, 1997). Simon (1960) suggested three decision phases and contextualised them for organisations. These phases were broadly classified as intelligence, design, and choice. Brim et al (1962) provided a substantial contribution to decision theory when they divided the decision process into five steps: identification of the problem, obtaining necessary information, production of possible solutions, evaluation of such solutions, and selection of a strategy for performance. All these decision models are, however, sequential. Strategy doesn't always work this way, so an alternative non-sequential decision model was proposed by Mintzberg, Raisinghani, & Theoret (1976). They used the same three major phases as Simon but gave them new names: identification, development and selection that were further supported by recognition, diagnosis, judgement, evaluation, and authorisation of the decision. Hansson (1994) had neatly provided a brief history of the evolution of decision thought and his comparisons are provided in my elaboration in table 7.

Table 7: Evolution of decision thought

Developer	Decision Process Stages
Condorcet (1793)	First discussion
	Second discussion
	Resolution
Simon (1960)	Intelligence
	Design
	Choice
Brim et al (1962)	Identification
	Information collection
	Solution generation
	Evaluation
	Selection
Mintzberg et al (1976)	Recognition
	Diagnosis
	Judgement
	Authorisation

Humans are imperfect as are their perceptions. Because of these imperfections, changes of perspective can reverse the relative apparent size of objects and the relative desirability of options (Tversky & Kahneman, 1981). In realistic decision making, judgements are based on heuristics, biases, values, predictions, and alternatives, which could be governed by the insensitivity to prior possibilities of outcomes, availability due to retrievability of instances (Tversky & Kahneman, 1974) or due to incomplete information (Brunsson, 1982). It is this same assumption that we as humans are poor knowers so all decisions should be treated as experimental and decisions should be structured such that they are reversible or easily modifiable (Etzioni, 2014). Decisions can be seen as choices, as mobilisers, as responsibility allocation, and as legitimation which were presented as the four roles of decision by Brunsson (1990). A summary of the various ideas from some of the relevant studies is presented in table 8 which is my own elaboration.

Table 8: Types of decision making

Theme	Developer(s)	Central concept
Phases of thought	(Dewey, 1910)	Linear decision theory
Decisions as problem solving in organisations	(Brim, 1962; Simon, 1960)	Linear decision theory
Decision theory model	(Mintzberg, Raisinghani, & Theoret, 1976)	Non sequential decision theory
Evolution of thought	(Hansson, 1994)	Decision theory
Probability, size, and possibility of options	(Kahneman & Tversky, 1979; Tversky & Kahneman, 1981)	Decisions under risk
Roles of decisions	(Brunsson, 1982; Brunsson, 1990)	Organisational decision making
Irrationality in decision making	(Brunsson, 1982; Brunsson, 1993)	Organisational decision making
Managing organisational paradoxes	(Smith, 2014)	Dynamic decision making
Reversible and modifiable decision making	(Etzioni, 2014)	Experimental decision making

My thesis considers the influence that the firm capabilities perceived by decision makers might have had on their decision making process. 'Capabilities' are the key role in strategic management in appropriately adapting, integrating, and re-configuring skills, resources, and competencies to exploit environmental changes (Teece & Pisano, 1994). Internationalising R&D could create a competitive advantage for a firm. This requires that a firm exploit its existing internal and external resources to explore new capabilities (Penrose, 1995; Wernerfelt, 1984). As described in the previous section, a part of this thesis explores how perceptions about various capabilities affect the offshore R&D. There is a gap in the explanation of how capabilities are used in developing an R&D arrangement offshore and how capabilities (or the lack of these) play a role in the progress on innovation at such centres. In addition, I also seek to explore how various factors influence the judgements of the decision makers and how these can have an effect on the way R&D is established offshore and developed further.

There have been interesting studies that explored how decision makers use their perceptions in justifying their choices. During decision making

there is a tendency for the group of decision makers of a firm to override pragmatic appraisals of the situation which leads to a lack of critical evaluation in the decision making group (Postmes, Spears, & Cihangir, 2001). Decision makers tend to rely on behaviours and personal experiences rather than on systematic strategies during decision making (Klein, 2008) and this leads to people using their experiences as a means of justification according to the patterns they observed from past learnings. Certain perceptions the decision makers have of the firm's environment affect the quality of the decision making. Perceived loyalty affects decision quality and perceived competence affects decision commitment (Dooley & Fryxell, 1999) while time pressures reduce the quality of the the decisions (Kocher & Sutter, 2006). According to some research, decision success is a measure of decision quality which in turn is considered to be a function of performance. In their study, Davern, Mantena, & Stohr (2008) proposed that decisions should be judged good or bad not by the outcomes but according to the quality of the process by which they were made, while Dean & Sharfman (1996) explored the link between decision making processes and decision success. Raghunathan (1999) studied the relationship among information quality, decision-maker quality, and decision quality to explore the impact information and decision makers have on the quality of decisions.

Musteen (2016) suggested that the decision to offshore may not be based on current theoretical models but can emerge from emotions or personal experiences such as from moderate levels of fear (Coget, Haag, & Gibson, 2011) or as a reaction to stimulus from one's networks (Ellis & Pecotich, 2001). Examining the factors that influenced the decisions is the characteristic that I explore in this thesis. Decision logic could arise from the firms' goals, the decision makers' experiences and expertise, and the internal and external organisational environment. There will still need to be logic and method in order to produce these choices. Results of sub-optimal decision logic in offshoring could result in a loss of competence (Grimpe & Kaiser, 2010), higher than expected costs (Larsen, Manning, & Pedersen, 2013) or issues with quality (Kinkel & Maloca, 2009). The effects can be strong enough for the negative offshoring outcomes of "back-reshoring" (Fratocchi, Di Mauro, Barbieri, Nassimbeni, & Zanoni, 2014) where parts of the manufacturing are re-concentrated or back-shored to the domestic

site (Kinkel & Maloca, 2009; Kinkel & Zanker, 2013; Kinkel, 2014) or completely re-shored (Ellram, Tate, & Petersen, 2013; Gray, Skowronski, Esenduran, & Johnny Rungtusanatham, 2013).

Decision maker's attributes is an area of research that is important in this thesis because it seeks to explain how different executives view the same situation and make choices. The divergence or convergence of the viewpoints of the decision makers may be indicative of the influence certains groupings of attributes have on the importance decision makers attach to decision choices. Several factors influence how decision makers make decisions in firms. The choices of the decision makers seem intuitive and judgemental (Barnard, 1938; Simon, 1987-1989) and attributes such as age, education, background and experiences might influence how they make decisions (Hambrick & Mason, 1984). Choices have an inherent behavioural component which biases the decision makers (Child, 1972; Cyert & March, 1963) or for a given stimulus, behavioural heuristics may influence choices and affect evaluations of effects (Haley & Stumpf, 1989). A given stimulus could be interpreted differently by decision makers in different organisations or sometimes even in the same organisation (Dean & Sharfman, 1993; Dutton, 1993; Haley & Stumpf, 1989).

My thesis provides a more nuanced understanding of how the knowledge of the decision makers of the firm, in terms of capabilities and activities, could be used to provide a basis for them to make better R&D internationalisation decisions for their organisation. How the decision makers of a firm utilise their personal experiences, expertise, knowledge of the environment, and their perspectives on the firm's internals to make the decision choices to offshore a part of the firm's R&D is one area to which this thesis seeks to contribute. The research questions that are in the field of strategic management, which are attended to in this thesis are:

RQ2: How do the decision makers affect the set-up and the outcome of the R&D configuration?

RQ3: How do the attributes of the firm and the decision maker influence within-firm and inter-firm differences?

Attempted Contributions

As I described earlier, this thesis uses internationalisation, capabilities, and decision studies in an attempt to close the gaps I uncovered from the previous streams of research. How decision makers interpret information to make and justify their decision choices is a contribution this thesis seeks to make to strategic management. By explaining how R&D is configured offshore depending on the way decision makers view their firm, and the resultant innovation outcome, this thesis hopes to contribute to both international business and strategic management. How this study seeks to contribute to theory is shown in table 9.

Table 9: Where this thesis seeks to contribute

Questions	Contribution	Theory	Area
RQ1	Offshore R&D configuration	Internationalisation Capabilities	International Business Strategic Management
RQ2	Setup and outcome affecting factors	Capabilities Decision Theory	Strategic Management Strategic Management
RQ3	Decision perspectives and influence	Decision Theory	Strategic Management

4. METHODOLOGY

> "If we knew what it was we were doing, it would not be called research, would it?" (Albert Einstein – theoretical physicist, Nobel laureate)

Chapter Summary: This chapter explains in detail the process I followed in carrying out this thesis. This is a qualitative empirical based Case Study research using 10 Swedish firms from which I interviewed 25 decision makers. The details of the firms and interviewees are presented here as well as how I collected and analysed the data. How the various levels of analysis are performed in this thesis is detailed in this chapter. The path from data to theorising and contribution is also explained.

Why Case Study Research?

Case study research as a methodology is found at the core of both international business (IB) and strategic management studies. There are several methodologies available in traditional IB research. In their discussion, Hurmerinta-Peltomäki & Nummela (2006) provided a value-added perspective of mixed methods in IB research. In a review of articles from four core IB journals, Piekkari, Welch, & Paavilainen (2008) discovered that case studies are the most popular qualitative research strategy. Early research in what we now call strategy management focussed on business policy and general management that were established at the Harvard Business School and where the traditional case-based study was founded for strategy research (Hitt, Gimeno, & Hoskisson, 1998). Some subsequent research produced rich empirical studies in strategic management. Collis (1991) studied firms in the bearings industry using the case study methodology, and this was still based on the traditional Harvard case-based approach. Doz (1996) collected data using interviews and used a qualitative theory-building

approach which was rare at that time for strategic management research, which mostly showcased theory testing philosophies.

These are some reasons why I used case study research as the vehicle of choice for this study. According to Markus (1983), case studies are useful when the researcher wields no influence on the environment and when the variables to be studied are unknown. Though written for Information Management research, this can be extended to IB and strategic management research. Using the condition where the inquirer has little or no control of the events, Yin (1984) argued that in such cases 'how' and 'why' questions are most appropriate, and hence the case study is the most practical choice. Benbasat, Goldstein et al. (1987) listed eleven characteristics of case study research, some of which are relevant to this study, as I have listed below:

- The phenomenon is studied in its natural setting
- No experimental control or manipulation is involved
- The focus is on contemporary events
- One or few entities (person, group, or organization) are examined
- Who and why questions are studied and links are traced back in time
- The results derived depend on the interpretations of the investigator

The case study method has traditionally been seen as a tool for inductive theory building. However, Welch, Piekkari, Plakoyiannaki, & Paavilainen-Mäntymäki (2011) challenged this conventional view and developed four methods of theorising from case studies that depended on the extent of contextualisation and causal explanation. According to them, the theorising methods are inductive theory building, natural experiments, interpretive sensemaking, and contextualised explanation. In this thesis, I have used the case study method for contextualised explanation and for inductive theory building. Blazejewski (2011) differentiated between four time-related dimensions in longitudinal case study research:

- case time: concerns the period of analysis
- research time: indicates the total time used for data gathering

- temporal research perspective: explains the researcher's positioning with respect to the case, and
- temporal data perspective: describe how the data sources used in the research relate to the case

Using the above dimensions this study has the research process starting only after the internationalisation has occurred. Thus the research time is after the case time. The research perspective is 'expost' or historical, and the data perspective is retrospective.

How Many Cases?

Selecting too few cases can make it problematic to generate a convincing theory while too many cases can result in unnecessary complexity and irrelevant data. While there is no consensus on an ideal number of cases, between four and ten seem to work well (Eisenhardt, 1989). Lervik (2011) explored the various options available for using cases within the multinational firm environment. He distinguished between single-N, small-N, and large-N case studies based on the objective that the researcher is trying to achieve. Single-N cases help in exploring a new phenomenon and in developing theory (Siggelkow, 2007; R. K. Yin, 2014); small-N cases allow for a degree of balance and generalisability across cases (Ragin, 1987) and large-N cases involve statistical testing of hypotheses (Piekkari et al., 2008).

In this study, a firm is considered a case. Within each sample firm, I interviewed the decision makers, and explored and analysed their views. These decision makers, who were part of their firm's R&D offshoring process, had the first hand but retrospective information of the events. Because they were associated with a firm and were acting on behalf of the firm they belonged to, their thinking was perhaps also influenced by the policies, strategy, and motivations of the firm. This is an exploratory 'Small-N Case' study using 10 case firms with interviews with decision makers in these firms. These are all cases of firms that have an R&D centre in India perhaps based on prior successful experiences elsewhere. There could possibly be a case of success bias where this process can lead decision makers

to make incorrect inferences regarding the reasons for success (Denrell, 2003) and this may be magnified as the organisation members form a collective identity based on common experiences (Barnett & Pontikes, 2008). Members of a successful organisation sometimes face the problem of trying to generalise from a system that excludes evidence of possible negative outcomes (March, Sproull, & Tamuz, 1991). In this study, I also have cases of firms that did not go to India for their R&D or re-shored subsequently, and these firms are treated as the 'negative' or 'failure' cases. I spoke to decision makers from such firms to understand their reasons for why they chose not to offshore R&D to India in order to learn whether they had a different line of reasoning in deciding against the offshoring.

Small-N cases are usually mostly inductive and used for theory building. Theorising from small-N cases is based on cases normally having a relatively close relationship, and the findings are interpreted by returning back to the cases and the case knowledge is used to build theory (Greckhamer, Misangyi, & Fiss, 2013). March et al. (1991) asserted that learning can occur from samples of one or fewer and this could be extended to building theory as well, from small samples. In their paper they recommend, in this situation, to make efforts to experience history more richly, to interpret experience in more ways, and to experience more of the events that did not happen. This situation has been explored in this study as well, in the instances where the 'negative' cases are analysed.

Sample: Dramatis Personæ[11]

There are several scenarios that I considered in this thesis in terms of the research setting, for selecting cases to isolate. Each of the choices had its merits and challenges.

- Swedish firms from different industry sectors offshoring to India;
- Swedish firms from the same industry sector offshoring to India;

[11] The term is Latin for "persons of the drama" and is commonly used in various forms of theatre. The term can be used in any situation where people or characters play a role and can also be used as a metaphor in a similar situation.

- One Swedish firm that offshored R&D to India

I discarded option 2 because I would not have the information to make a comparison between different types of industries. I wanted to learn about R&D offshoring from various perspectives, and I assumed that firms from one industry may have had many similarities. I rejected choice 3 on two grounds. Firstly, I did not want to localise my study to just one firm as that would make it too firm-specific and it would have been hard to isolate exactly which firm I needed to study. Secondly, in most firms, there would be only three or four decision makers, and that would have been too few to study, especially for any possible divergence in viewpoints among them. Thus, I settled on option 1 and initially tried to select as many firms as was possible, before narrowing down the selection based on response rates and ease of access. My starting point for collecting the sample was to get a list of Swedish firms in India. In order to get this list, I chose the business guide provided by the Swedish Chamber of Commerce in India. The Sweden-India Business Guide is a detailed and accurate resource bank of businesses between the two countries, and it contains a comprehensive list of Swedish companies in India and Indian companies in Sweden. I interviewed a senior representative of the Swedish Chamber of Commerce in New Delhi, India and received this document as an authentic list comprising those Swedish firms that were registered with the business council. This list contains Swedish companies that have a presence in India. These firms may have any form of presence in India and may not necessarily have any R&D activity in India. It could be a sales office, a marketing office, a production centre, service centre, or a multi-functional establishment which includes an R&D centre.

The cases were selected by theoretical sampling using theoretically useful cases. As offshoring of R&D is a relatively new phenomenon and to work with recent data, I chose firms that had offshored their R&D functions in the last 20 years from the year 1995 onwards. Empirical data were collected from interviews with the decision makers responsible for or having extensive knowledge of the offshoring decisions. I considered a firm Swedish when it had its headquarters in Sweden. From this list of 126 firms, 115 had their headquarters in Sweden. Contact information was

available for 79 of these 115 firms. In March and April 2015, I emailed a survey (this is available in the appendix) to the contacts in each of these 79 firms and asked them whether they had R&D activity in India and whether they would be interested in participating in this research. Contacts from 24 firms responded to the survey out of which 6 were interested in participating in the study and 7 showed some interest in participation. I also directly contacted people from 11 firms via emails, and contacts from 3 of those firms responded. From these, decision makers from 2 were interviewed but found unsuitable as they didn't have any R&D facility in India. One other firm had R&D in India and expressed interest in participating in this research study but did not proceed further. In addition, I also found informal channels a beneficial way of obtaining information. I used LinkedIn to identify relevant people to contact in potential case companies. The website provides a good search function which can be used to identify groups of people that are interesting to you. Where survey results failed to generate any contacts, I searched for R&D departments in the firms where I needed to see if I could find a connection. Using a string for 'company X' + 'job role Y' would generate a list of people in position 'Y' working in firm X'. Via this channel, I found contacts in 4 firms out of which decision makers from 2 firms responded and I subsequently interviewed them.

A third channel I used was the Corporate Relations department of my school. Stockholm School of Economics has built partnerships with alumni, friends and corporations, both in Sweden and internationally. This is the department in the school that works to build long-lasting and strategic partnerships with corporations to support research, recruitment, and education. Through my contact with the Corporate Relations department, I gained a foothold in 1 further company and used snowball sampling from the contact I spoke with within that firm. The narrowing down of the sampling process leading to the final selection stage is represented in table 10. The numbers in the table indicate firms not people.

Table 10: Case selection numbers

Initial list	HQ in Sweden	Contact method	Responses	R&D in India	Willing to be interviewed?	Interviewed
126	*115*	*Survey: 79*	*24*	*Yes: 13*	*Yes: 6*	*5*
					Maybe: 7	
				No: 11	*Yes: 1*	*0*
					Maybe: 2	
		Email: 11	*3*	*Yes: 2*	*Yes: 2*	*2*
		Linkedin: 4	*2*	*Yes: 2*	*Yes: 2*	*2*
		School: 5	*1*	*Yes: 1*	*Yes: 1*	*1*

Source: Own elaboration

The sample for the research is segregated based on the grid shown in table 11. This is a view separated by industry type and firm size. The categories of size and industry activity came from Bureau van Dijk's Orbis[12] database. In table 11, the columns that show R&D presence in India, the type of R&D, and the willingness to be interviewed, are from the answers provided by the decision makers to the survey that I had sent before the interview process.

[12] Orbis contains information on nearly 150 million companies worldwide, with an emphasis on private company information. It is available at http://orbis.bvdinfo.com

Table 11: Summary of firms contacted[13]

Firm Name	R&D in India	Willing to be interviewed?	Actually interviewed	Industry	Size
Titania	No	No			
Uberon	No	No			
Charon	No	No			
Ganymede	Yes	Maybe		Information and communication	Very large
Callisto	Yes	Maybe		Information and communication	Very large
Umbriel	No	Maybe			
Ariel	No	No			
Io	Yes	YES	YES	Manufacturing	Small
Europa	Yes	YES	YES	Administrative and support service activities	Small
Quaoar	No	YES		Manufacturing	Very large
Titan	Yes	Maybe		Professional, scientific and technical activities	Medium
Miranda	No	Maybe			
Hygiea	No	No			
Rhea	Yes	YES	YES	Manufacturing	Medium
Proteus	No	No			
Iapetus	Yes	Maybe		Manufacturing	Very large
Dione	Yes	Maybe		Information and communication	Medium
Tethys	Yes	YES		Information and communication	Large
Mimas	Yes	YES		Manufacturing	Very large
Cybele	No	No			
Nereid	Yes	Maybe	YES	Manufacturing	Very large
Triton	Yes	Maybe	YES	Professional and scientific activities	Small
Herculina	No	No			
Pandora	Yes	No			
Eris	Yes	YES	YES	Manufacturing	Very large
Themis	Yes	YES	YES	Manufacturing	Medium
Nemesis	Yes	YES	YES	Manufacturing	Very large
Phobos	Yes	YES	YES	Information and communication	Very large
Deimos	Yes	YES	YES	Information and communication	Medium

[13]The company names are some of satellites ('moons') in our solar system, specifically those that revolve around the giant planets – Neptune, Uranus, Jupiter, and Saturn. The R&D centres outside Sweden may perhaps be satellites as well, in some ways.

For the purpose of this thesis, I have combined firms in information and communication, and services into a category called 'Technology and Services'. There are now two categories – Manufacturing, and Technology and Services. Furthermore, for the size, I have simplified the sample into large and small. Because I don't expect any major differences between 'large' and 'very large', and 'small' and 'medium' I have considered 'Large' to include both large and very large, and 'Small' to include both medium and small. I expected firms in the manufacturing sector to be on the larger side just because of the type on investments they have and the products they sell. Table 12 is a summary of the numbers of firms by size and industry. The details of the firms and the interviews are shown later in this chapter.

I considered these two different industries, and sought to explore their decision making process for R&D offshoring. I also interviewed decision makers from a Swedish firm that had chosen not to offshore R&D and decided to retain its R&D in Sweden, and a decision maker from a Swedish firm that had offshored part of its R&D to India but had later re-shored it to Sweden. Their viewpoints on this phenomenon provided for a richer understanding of what decision makers said and why their opinions diverged (and in a few themes converged) resulting in a different action.

The Firms

Based on the survey sent out in March and April of 2015, and the responses received, I selected some firms to work with, in this study. This selection was also driven by the ease of access to the senior management in these firms. Decision makers from several firms were not very responsive to either email or other forms of contact, so my selection of firms was restricted to the decision makers that showed an interest in being interviewed. There were survey respondents who belonged to firms that had R&D in India and were willing to be interviewed, but subsequently could not be contacted. These are from firms Ganymede, Callisto, Titan, Iapetus, Dione, Tethys, and Mimas. The firms selected for this study are shown in table 12, segregated by size (small and large) and whether they are in the very broad manufacturing or technology sectors.

Table 12: The firms by size and industry[14]

Industry		
Technology and Services	F6 (Phobos)	F2 (Triton) F3 (Europa) F7 (Deimos)
Manufacturing	F4 (Eris) F8 (Nereid) F9 (Nemesis)	F1 (Io) F5 (Rhea) F10 (Themis)
	Large	Small

The firms from where the decision makers were interviewed are briefly described here. The names of the interviewees are aliases and are derived from common Swedish first names and surnames, or in case of Indian decision makers, common Indian first names and surnames. A brief description of the firms and the profiles of the decision makers interviewed is shown in the firm profiles that follow.

Firm Profiles

Company: F1 (Io)

Established in the late 1800s and headquartered in Landskrona, Io is a manufacturer in the automotive sector. It provides innovative commercial vehicle technology, specialising in braking and suspensions products. Io is a worldwide technology leader in providing commercial vehicle systems, hydraulic systems, and traction systems. As of 2008, Io has 23 production facilities – including one in India – and their geographic scope of service is worldwide.

Decision Maker 1: Anders Nilsson, Senior Vice President, R&D

Decision Maker 2: Per Blomberg, R&D Manager, India

Decision Maker 3: Malin Nyland, Vice President, R&D, Europe

Company: F2 (Triton)

[14] This table includes the codes I use to represent the firms. Please see table 13 for the details of the firm codes.

Founded in 1999 and with nearly 15 years of experience in managing schools, Triton is a privately owned Swedish firm that operates schools in Sweden and provides education and learning services in schools outside Sweden. With a long-term commitment to excellence and world-leading standards in schools and education, Triton has grown to, as of 2015, a network of 15,000 students and 1,500 employees. With its flagship product and innovative learning portal, Triton hopes to empower all of its students with personalised education that will help them acquire a better life. Decision Maker 1: Sofie Malmgren, CEO
Company: F3 (Europa) Registered in Stockholm in 2005, Europa is a small Swedish Information Technology firm that specialises in providing highly customised programming services in systems and software engineering, mobile applications, and computer-aided design solutions. With a dedicated centre in India, Europa can combine the better of two worlds – cost reduction from India and quality control from Sweden. Europa's vision is to be the number one choice for companies seeking support in IT. Decision Maker 1: Raj Singh, CEO Decision Maker 2: Anders Dahl, COO / Deputy CEO
Company: F4 (Eris) Founded in Götaland and headquartered in Stockholm, Eris is a large manufacturer in the automotive sector. Eris is a global company with a sales and service organisation in more than 100 countries. Aside from sales and services, it offers financial services in many markets. It initially entered India in 2007 with a partnership with a local firm before establishing its subsidiary in 2010. Besides having procurement centres in India, Eris offers comprehensive transport solutions. Decision Maker 1: Stefan Lind, Senior Vice President, R&D Decision Maker 2: Johanna Larsson, Head of RPC and Component Support, R&D Decision Maker 3: Mats Eriksson, Director R&D, India
Company: F5 (Rhea) Founded in 1932, Rhea is a manufacturing firm that provides robust machining solutions to leading companies around the world. Their industry solutions for the aerospace, oil & gas, automotive, energy, wind power, and medical sectors contribute immensely to improving the productivity and competitiveness in metal cutting machining. Initially operating as a leading supplier in Western Europe and North America, Rhea has grown rapidly in Asia, initially via distributors and later through fully owned subsidiaries and acquisitions. Rhea now exists in more than 60 countries. Decision Maker 1: Erik Borg, Senior R&D Manager Decision Maker 2: Mats Olsson, Vice President, R&D Decision Maker 3: Ajay Mehta, General Manager R&D, India
Company: F6 (Phobos)

Headquartered in Stockholm, Phobos is a large corporation that provides communication technology and services. Phobos offers the entire suite of products in its industry from network equipment and hardware, mobile equipment and software, cable and fixed services, and traditional telecommunications. Phobos in one of Sweden's biggest employers and the corporation operates worldwide. It was one of the early first Swedish entrants in India in the early 20th century and now has a large presence in India.

Decision Maker 1: Alex Jonsson, President, India region
Decision Maker 2: Lars Wilander, Vice President, Infrastructure and Hardware
Decision Maker 3: Lars Olsson, Manager
Decision Maker 4: Jan Olofsson, Head of Technology Supply

Company: F7 (Deimos)

Established in 2009 in Stockholm, Deimos provides a global telephone directory service that has caller ID, social media integration and call-blocking functionality. It uses crowdsourced data and can search directory information even where public data are not available. The product is available in 35 languages and has reached 100 million users worldwide. The application is available in almost all countries, and the product is available on all mobile platforms and operating systems. India is now Deimos' strategic delivery centre.

Decision Maker 1: Adam Berg, CTO
Decision Maker 2: Ram Prasad, Managing Director, India

Company: F8 (Nereid)

Nereid is a global manufacturer and among the world's largest automotive suppliers with worldwide sales and services. Nereid has a comprehensive product suite and is one of the most advanced and innovative truck manufacturers. Nereid has nine assembly plants around the world, as well as eight factories owned by local partners. The company's India operation was established in 1996.

Decision Maker 1: Stefan Eriksson, Senior Vice President, R&D
Decision Maker 2: Amit Pal, Chief Engineer and Site Manager, India

Company: F9 (Nemesis)

Nemesis is a global industrial manufacturing giant based near Stockholm. It was founded in the late 1800s and manufactures industrial tools and equipment. As of 2015 Nemesis employs more than 40,000 people and has production sites in more than 20 countries. Nemesis serves more than 180 countries with its innovative solutions for productivity, energy efficiency, and safety. Nemesis established in India is 1960 but opened its R&D centre in India recently. Today, India is Nemesis' fifth largest market.

Decision Maker 1: Per Wilander, Vice President, R&D
Decision Maker 2: Erik Lundquist, Vice President Engineering Services
Decision Maker 3: Vikram Mehra, Vice President R&D
Decision Maker 4: Arun Dhawan, General Manager

Company: F10 (Themis)

Themis was founded in 1950 in Halland. For over 60 years now it has been at the forefront of manufacturing and supplying core composite material to various industries such as marine,

wind energy, aerospace, and transportation. With sophisticated production units in more than 35 countries, Themis supplies to all geographic regions. It is a relatively small firm because of its niche business.

Decision Maker 1: Caroline Söderberg, Group CTO

The Decision Makers

Data were collected via interviews with the decision makers in the selected firms, from questionnaires sent via emails, and some information from the firms' websites. All interviews were recorded with a digital voice recorder, with prior permission of the interviewees. I transcribed verbatim, all the recordings into text documents. 1 hour of recording took approximately 6-8 hours to manually type to text information. I analysed the resulting text files for keywords, common themes, and interesting revelations. The summary of the firms is shown in table 13.

Table 13: Firm details

Firm	Code	Size	Industry	R&D	Interviewees
Io	F1	Small	Manufacturing	Offshored	3
Triton	F2	Small	Technology and Services	Offshored	1
Europa	F3	Small	Technology and Services	Offshored	2
Eris	F4	Large	Manufacturing	Offshored	3
Rhea	F5	Small	Manufacturing	Offshored	3
Phobos	F6	Large	Technology and Services	Offshored	4
Deimos	F7	Small	Technology and Services	**Not offshored**	2
Nereid	F8	Large	Manufacturing	Offshored	2
Nemesis	F9	Large	Manufacturing	Offshored	4
Themis	F10	Small	Manufacturing	**Re-shored (previously offshored)**	1

The firms have been assigned codes as shown in the table, and these codes will be used in the thesis wherever the corresponding firm is referenced. I used these codes during the coding and analysis phase also to easily make groups and clusters. For example, F3 wherever it is in this thesis refers to the firm Europa (The name Europa is itself an alias). Some respondents preferred detailed questionnaires in addition to being interviewed. The questionnaires were sent via email and the responses were analysed in the same way as the interview transcripts were. The interviewee details are shown in table 14.

Table 14: Interviewee details

FIRM	DECISION MAKER	FUNCTION	NATIONALITY
F1	Anders Nilsson	Management	Swedish
F1	Per Blomberg	Technology	Swedish
F1	Malin Nyland	Management	Swedish
F2	Sofie Malmgren	Management	Swedish
F3	Raj Singh	Management	Indian
F3	Anders Dahl	Technology	Swedish
F4	Stefan Lind	Management	Swedish
F4	Johanna Larsson	Technology	Swedish
F4	Mats Eriksson	Technology	Swedish
F5	Erik Borg	Management	Swedish
F5	Mats Olsson	Management	Swedish
F5	Ajay Mehta	Technology	Indian
F6	Alex Jonsson	Management	Swedish
F6	Lars Wilander	Management	Swedish
F6	Lars Olsson	Technology	Swedish
F6	Jan Olofsson	Technology	Swedish
F7	Adam Berg	Technology	Swedish
F7	Ram Prasad	Management	Indian
F8	Stefan Eriksson	Management	Swedish
F8	Amit Pal	Technology	Indian
F9	Per Wilander	Management	Swedish
F9	Erik Lundquist	Management	Swedish

F9	Vikram Mehra	Technology	Indian
F9	Arun Dhawan	Technology	Indian
F10	Caroline Söderberg	Technology	Swedish

The reasons why there are differences in the numbers of interviewees across the firms are because of the type of firm and the access to information of the individuals. F6 and F9 are large conglomerate firms with several levels of management and the individual decision makers I interviewed had only partial views of the whole picture of the scenario. Only after interviewing 4 decision makers from these two firms did I get a good enough perspective of the offshoring. F2 is a small firm with very few direct decision makers. The decision maker from F2 had access to all the information and was completely involved in all stages of the decision making. F10 was a case of re-shoring and the decision maker I interviewed provided information about both the initial offshoring and the subsequent re-shoring. For all the other firms, I could capture good information from interviewing 2 or 3 people as the case may be, to make a good assessment of the respective cases.

The Interview Process

The interviews for this study were conducted between April 2015 and April 2016. The decision makers were either interviewed face to face in person if they sat in Stockholm or were interviewed over the telephone or via a video call using Skype. The interviews were semi-structured and were generally based on a questionnaire which was the guideline I used for the interviews. This questionnaire is available in the appendix. After the initial exchange of pleasantries and introductions, I usually started the conversation by asking the decision makers to provide a history of the centre in India and their involvement or role in it. This is an open ended question and often provided me with explanations of the motivations of offshoring, the R&D activities being performed at the centre, and the influence the decision maker had in the setup or the activities being done there. Depending on the quality of the answers - some decision makers gave detailed answers with a lot of information – this was in some cases the only question I had along with a few additional questions depending on their answers. The second ques-

tion that I asked the decision makers was to describe how they made these decisions. The answers to this question provided explanations to the decision making process of the decision maker or the decision making group in the firm, how they made evaluations from the choices they had available, and what they thought were important criteria to consider. The third question that I asked all the interviewees was about the challenges and dilemmas they faced during offshoring and in the centre in India. This allowed them to express themselves and resulted in many personal experiences and viewpoints. The answers to this question also provided an insight into the differences in thinking between Indian and Swedish decision makers and how challenges appeared to have a somewhat cultural context.

When I did not get the information I needed from the three questions above, then I asked specific questions about the R&D centre: how it was established, the activities that were being performed there, and the kinds of choices the decision makers made while setting up the centre in India. Depending on the responsiveness of the interviewee, sometimes 4 or 5 questions were enough to provide all the information I needed, while in other cases additional questions were necessary in order to gather the relevant information. All the decision makers interviewed were either directly involved in the decision making or had access to the decision making. Though this is ex-post and the details are subject to the individual's memory, hindsight biases were somewhat moderated because all participants had familiarity with the subject and the task (Christensen-Szalanski & Willham, 1991) and the personal and task characteristics (Mazursky & Ofir, 1990). The difficulty of the problem (Lichtenstein, Fischhoff, & Phillips, 1982) and "surprisingness" of the event (Fischhoff, 1975) are some interesting hindsight effect moderators, and as R&D offshoring is neither a surprising event nor an especially problematic one, this effect can be somewhat minimised. Moreover, hindsight bias is significantly larger for negative outcomes than it is for positive outcomes (Schkade & Kilbourne, 1991). There wasn't much of a disappointment effect because in general for all the firms the result was by and large in control, except for firm F10 in which case the decision maker proved to be quite candid with her answers.

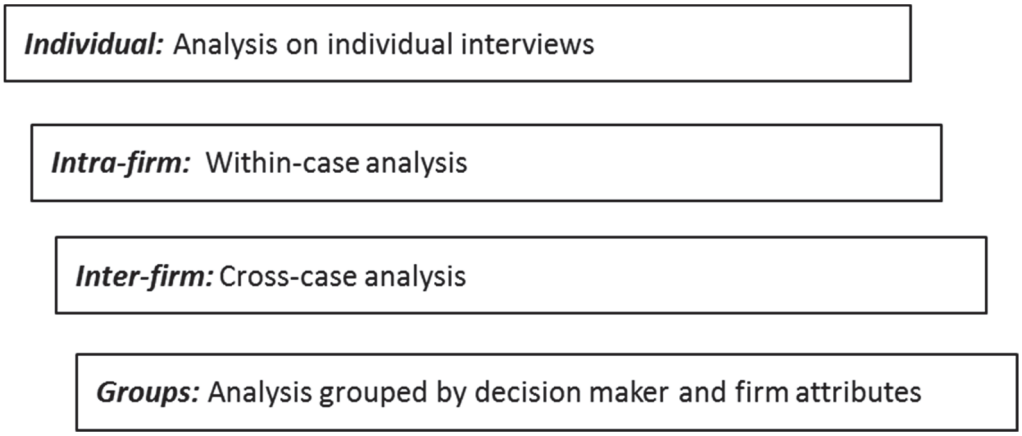
Analysis: The Process

Analysis: Units and Levels

While searching for discussions on content analysis processes and protocols, I came across good articles which I found described the process of analysis very elegantly, which although borrowed from the clinical nursing and health administration literature streams, are quite relevant to strategic management research as well. Content analysis is a widely used qualitative research technique where in conventional content analysis, coding categories are derived directly from the text data (Hsieh & Shannon, 2005). Text data might be in verbal, print, or electronic form and may have been obtained from narratives, interviews, or observations (Kondracki, Wellman, & Amundson, 2002). Elo, Kyngäs (2008) explain that content analysis is a method that can be used with either qualitative or quantitative data, in an inductive or deductive way, and in every case is represented by three main phases: preparation, organising, and reporting. Whichever method is used, the analysis starts with selecting the unit of analysis (Cavanagh, 1997; Guthrie, Petty, Yongvanich, & Ricceri, 2004; McCain, 1988). What is to be analysed and the sampling conditions are important factors to consider before selecting an appropriate unit of analysis (Cavanagh, 1997). According to Graneheim & Lundman (2004), the most suitable units of analysis are whole interviews that are large enough to be considered whole and small enough to retain context.

In this thesis, the firm is the unit of analysis because the thesis establishes how the firm is affected via the influences of the decision makers. All the choices result in an impact on the firm. I chose to analyse the data at several levels in order to get a richer understanding of how the various attributes of the firm and decision makers, affected the offshoring dynamics. The levels of analysis are based on grouping the decision makers according to whether they are from the same or different firm, or their own backgrounds, and according to the attributes of the firm. There are four levels of analysis as shown in figure 2, which are used to explore the similarities and differences across various types of aggregations.

Figure 2: Levels of analysis



How the levels of analysis are approached is explained in various chapters of this thesis. I analysed the interviews, interpreted the quotes into main keywords that provided the individual level analysis of the data. For every decision maker, the important keywords are presented in tabular form at the end of the narrative of each firm. That chapter also shows the viewpoints of all the decision makers, and the intra-firm differences are developed where the divergent views of decision makers are explained. The inter-firm analysis is explained when similarities or differences between firms lead to how R&D is configured, and this is explained in the process that is developed for that purpose. The group wise analysis is explained where certain groupings of decision makers lead to similarities in views which may end up converging across firms or diverging with the firms.

Coding: From Data to Theory

The analysis of the data involved making sense of each interview. The first round of coding was done manually without any tools. I read every interview and went over the data with coloured markers to highlight important keywords, sentences and terms. I also made notes on paper to summarise and simplify the data. I developed a summary sheet where for every interview, I recorded the main themes. This provided a complete list of themes from all the summary sheets. I analysed all the interviews and developed codes and categorised them. After this initial parsing of information, I sub-

sequently worked with MaxQDA which is computer software tool for qualitative data analysis. I assigned codes that were directly referencing the research questions, and new codes were added during the coding process whenever interesting information, patterns or themes emerged from the answers of the respondents. The primary objective of coding was to form a structure that would help to compare not only within the cases but also across cases. Most of the codes have a prefix word to facilitate easy identification and grouping. The coding schema is the list of codes I generated using MaxQDA and is presented in table 15.

Table 15: Coding schema

Categories (with codes indented)	**Description**
Firm characteristics	What is the type of firm
Firm: Firm specific advantages	Firm's advantages or specific capabilities
Firm: Large technology	A large firm in the technology sector
Firm: Small technology	A small firm in the technology sector
Firm: Large manufacturing	A large firm in the manufacturing sector
Firm: Small manufacturing	A small firm in the technology sector
R&D project	The type of R&D performed offshore
Activity: Fuzzy definition of R&D	No clear definition of what constitutes R&D
Activity: Standard product	The standard product of the firm
Activity: Product simplification	Develop simpler products for the market
Activity: Local adaptations	Develop locally customised products
Activity: Low-risk, low-tech work	Mainly development, mainly 'D'
Activity: Emerging market hub	Develop into an emerging market R&D hub
Activity: Support functions	Perform support functions for global R&D
Activity: Product development	New product design and development
Innovation characteristics	How innovation is configured offshore
Type: Innovation is from a market pull	Innovation is market driven
Type: Innovation is a product push	Innovation is product driven
Type: Innovation is innovative activities	Innovation is to derive value
Type: Innovation is quality driven activities	Innovation is to increase efficiency
Type: Innovation is cost savings activities	Innovations is to reduce costs
Decision characteristics	The role of decision makers and situations
Use: Need to retain core activities	Necessity to retain core activities in Sweden

Use: Degree of ease of offshoring R&D	It was difficult to offshore R&D
Use: Degree of centralisation	Necessity for R&D centralisation
Use: Degree of ease of decision making	How easy was it to arrive at the decision
Use: Executive decision	Decision taken at board level
Use: Consensual decision	Decision taken collaboratively with teams
Use: Individual decision	Decision taken largely at an individual level
Decision process	The choices made during decision making
Process: Decision tools, and analysis	Usage of decision tools
Process: Investments and utilisation	Financial and resource budgeting
Process: Centre or R&D expansion	Plan to develop and expand R&D
Process: Select a project	Choose the R&D project
Process: What to do offshore and how	The decisions about what to do and howt
Process: Establish the management structure	Establishing the organisation and governance
Process: Choosing a mode of entry	Deciding how to enter: Make, Buy, or another
Process: Evaluating the locations	Analysing the various candidate locations
Decision Motivations	The triggers managers said were used
Driver: Location specific advantages	Advantages of being in India
Driver: To be close to the customer or market	Necessary to be close to the customer or market
Driver: To be close to production	Necessary to be close to production
Driver: Need to modernise the industry	Need to introduce technology to to market
Driver: Need to be in the emerging market	The need to be in an emerging market
Driver: Exploiting the market size	Accessing a large market
Driver: Not missing the opportunity	The need to be in India
Driver: Seeking cost advantages	Seaching for low costs
Driver: Seeking resource advantages	Looking for large scale skilled resources
Encouraging factors	What managers use to legitimise their decisions
Accelerator: Develop the market or technology	New product or technology provider in a market
Accelerator: Follow the logic of others	Others firms have done it too
Accelerator: Prior experience in offshoring	The firm has offshored before
Accelerator: Past trends about R&D offshoring	India's relevance as a R&D destination
Accelerator: Presence of an R&D cluster	Many firms exist in the same location
Accelerator: Presence of Indian context	Firm's footprint in India
Accelerator: The size of the opportunity	India's market size
Discouraging factors	What factors affect the progress of the off-

	shored centre
Decelerator: Immature market or technology	Market is not ready for innovative technology
Decelerator: Inefficiences in operations	Inefficiencies in processes, governance, communication
Decelerator: The requirement to make a simpler product	India accepts on simpler types of specifications
Decelerator: The significance of distance	Ggeographic, cultural, or from the market
Decelerator: Lack of being able to see the entire product	Engineers work on small parts of the product
Decelerator: Difference in the understanding of quality	Sweden and India have different quality benchmarks
Decelerator: Lack of a depth in knowledge	Product knowledge is different for both sides
Decelerator: Gaps in competence	Engineering skill is comparable on both sides
Operational considerations	Information about additional challenges
Develop and incorporate learnings	Assimilation and distribution of learning
Challenges with confidence	Issues of confidence with the Indian centre
Tight management control	Management overheads
Distance or location intricacies	Is it significant or not
Unknown brand name	Impact of the brand
Lower quality products offshore	Different product specifications
Challenges with hierarchy differences	Effect of management structure
Challenges with co-ordination	Effect of management overheads
Challenges with external environment	Institutional, adminstrative, partner issues
Challenges of culture and language	Effect of local intricacies
Useful quote	Highlights relevant quotes that are useful to the study

Theorising and Contribution

When it comes to qualitative research, moving from ideas to a theoretical contribution (Rindova, 2011) and what constitutes a theoretical contribution (Corley & Gioia, 2011; Whetten, 1989) remain an ongoing challenge for management scholars. According to the theory building authorities, a complete theory must contain four elements (Dubin, 1978; Whetten, 1989): what – the factors to be considered as part of the explanation; how – operationally connecting all the boxes; why – explaining the underlying dynam-

ics justifying the choices; who, where, when – the limiting conditions that set the boundaries of generalisability. The above-mentioned building blocks of theoretical contribution are reflected by the two dimensions of originality and utility (Corley & Gioia, 2011). They emphasised that the idea of a contribution is the ability to provide original insight into a phenomenon by advancing knowledge in a way that is deemed to have utility or usefulness for some purpose. I considered this applicable to my thesis as well in developing some theoretical insight. Offshoring is quite well researched from various streams of literature, so there are no revelations but rather my findings aim to provide an insight into the offshoring of R&D that are practically useful. There are academically and scientifically meaningful contributions to decision making as well as when it comes to exploring the decision logic. Theorising from case studies is still an important challenge in case study research. Ridder, Hoon, & McCandless Baluch (2014) addressed the question of how to enter into a dialogue with existing theory in theory building case study research in the management field. Using the criteria described by Ridder et al. (2014), I positioned this thesis to seek complementarities by aligning to findings to the theoretical stream corresponding to the IB and strategic management fields. This is a synergistic positioning of the dialogue with existing theory and the study leads to an extension of extant theory, which in this case is the intersection of international business and strategic management.

For further analysis of the interviews, I loosely utilised the method developed by Gioia, Corley, & Hamilton (2013) to condense the data. I used a systematic presentation of both a 1st-order analysis, which is the information-centric representation of terms and a 2nd-order analysis, which is a researcher centric arrangement into themes and higher abstractions. By the 2nd-order analysis, we start to enter the theoretical domain and the concepts from this level help at arriving at explanations for the phenomena being studied. To illustrate the process of how I arrived at theorising, tables 16a and 16b present an example using a small extract of the data from the interviews. I moved from the quotes by assigning them to concepts and then further to categorising them into themes and aggregating the themes into dimensions. Here we enter into the theoretical realm and further into the development of theory. I partially used the method described above and

the four stages developed by Smith (2014) to arrive from data to theory, namely: developing thick descriptions; identifying key issues; identifying patterns; incorporating findings to build a theoretical model. Once I arrived at the aggregate dimensions, I transformed those dimensions to build suitable components that help explain the phenomenon being studied, and work further to develop theory.

Table 16a: From the data domain to the theoretical domain – Quotes to First Order Concepts

Quotes	**First Order Concepts**
"Here we do this kind of value solutions, the kind the market is prepared to pay for"	Develop a value solution
"Our scope of R&D is to design the complete product for the value market."	
"When we are getting demands from a US client and a Swedish client, the quality in code levels are monitored by Swedish clients."	Develop to the quality the Swedish market demands
"Lot of confidence Sweden developed on us because we've been delivering with lot of quality."	
"We have development in our R&D centre, product development."	Developing a new solution
"We have the full responsibility to develop a new product."	
"We have more product innovations type of work."	Develop innovative products
"How we work is working on excellence, working on innovation."	Expertise and excellence based work
"We're quite specialised and there are not so many that do what we are doing and so it's not like that."	Specialised product
"I think we are probably quite unique."	
"Where our competitive advantage is sitting is on processes, methods, and tools."	Internal processes
"The other capability is the distribution of work that is also helping us."	

Table 16b: From the data domain to the theoretical domain – First Order Concepts to Aggregate Dimensions

First Order Concepts	Second Order Themes	Aggregate Dimensions
Develop a value solution Develop to the quality the Swedish market demands	**Quality Driven**	
Developing a new solution Develop innovative products Expertise and excellence based work	**Innovation Led**	R&D OBJECTIVE
Specialised product Internal processes	**Engineer / Product centred**	R&D ORIENTATION

5. NARRATIVES: INTRA-FIRM STORIES

> "I sometimes find that in interviews you learn more about yourself than the person learned about you." (William Shatner – actor, author, producer, director)

Chapter Summary: This section is the narrative of the interviews with the decision makers. It comprises quotes from them and what they suggest. The keywords and central messages are developed decision maker wise and are shown in tabular form for each firm. What R&D means according to them, what those activities are, and what they believe capability is in their respective firms is also explored. The individual views of the main reasons or drivers for offshoring the R&D along with their interpretation of the decision process are also presented. The challenges the decision makers, or the firm they belong to, faced in this process are also shown.

Firm F1

F1 was established in Sweden more than 100 years ago and presently operates worldwide with offices in 18 countries. It develops and provides reliable and innovative solutions that improve vehicle safety. It is relatively small firm in the manufacturing sector. In India, F1 started production in 1997. They have been very active in supplying the market with brake adjustments for ground brake systems and now have two production sites there.

India is a large market, and the need to be in the market puts pressure on firms to go there. Decision makers from many of the firms rationalised that products in India need to be simpler thereby bringing down the cost. F1 also assumes this line of reasoning. This suggests that although the mar-

ket overall in India is large, it accepts only certain types of products and is cost-effective only for those products that generate volume sales.

> "It was more that we needed or wanted to be on the Indian market because we knew there would be legislation that would support our product and we also understood that we cannot ship components from Europe to India. We want to be closer to the bigger markets because logistics costs are quite high for the components." (Anders Nilsson, Senior Vice President R&D)

That was the background and also the target for this development in India which was to try to bring in products within F1's existing portfolio but to simplify them and make them cost-effective for the Indian market. F1 started its R&D in India primarily to become a low-cost centre for low intensity, low specifications products. Furthermore India also provides a firm with a large number (although this does not mean highly competent) of engineers. This allows firms to implement strategies based on higher economies of scale that wouldn't have been possible with a smaller pool of engineering talent.

> "I think there were different reasons but one reason was that we saw an opportunity in the engineering level, which is quite good in India, and we already had plants in place and also there is a requirement for R&D resources in India." (Per Blomberg, R&D Manager, India)

F1 acquires or allies with other firms for its market entry mode. The reason for going to India according to Anders Nilsson, Senior Vice President R&D, is market and product acquisition. When F1 buys or allies with a firm, it gets a new technology, a new product line and the main research and development centre for that product.

> "We wanted their products and we wanted the market. If a company has a lot of money, they want to grow so they invest in technology so they buy company that has the technology that suits the complete portfolio. So we have been acquiring companies that have been working in brake components for commercial vehicles." (Anders Nilsson, Senior Vice President R&D)

F1's R&D in India remains a low intensity, low technology activity still primarily motivated to save costs. India appears to be a market which is still not ready for the level of products that are sold in Europe and North America, or not willing to pay the cost of the high specifications associated with the regular portfolio products. The R&D is hence primarily focussed on driving down the cost of such product variants. As mentioned in an extract given earlier the task for the Indian R&D is to bring down the cost and to simplify those products.

> "It's mostly product development. Basic fundamental research is little bit too small. The task for the Indian R&D is to bring down the cost and to simplify those products." (Per Blomberg, R&D Manager, India)

> "We can use R&D resources in India in a good and efficient way and maybe lower our cost, our hourly cost." (Anders Nilsson, Senior Vice President R&D)

> "The R&D centre is mainly focussed on developing products for the Indian market with a little lower specification and so on. They are in contact with specific customers and they develop products for India only." (Malin Nyland, Vice President, R&D Europe)

The Indian R&D is only developing variants of already existing products. However, they are new because some products cannot be cross-optimised. So one has to start almost from scratch by looking at the same product and thinking about how one can make it cost-effective. So, it is not an entirely different product but rather a variant.

> "We also see that as a good strategic decision to open a good R&D centre in India to make it quite big and long term we'd like to support other sites with R&D tasks." (Per Blomberg, R&D Manager, India)

When queried about capabilities and what constituted an advantage for the firm, the decision makers believed that being small was an advantage as it made them more responsive to the customers and allowed them to quickly develop the R&D into producing a meaningful solution for their customers. These are capabilities according to the decision makers.

> "So we try to use our size to our advantage, our small size." (Anders Nilsson, Senior Vice President R&D)

> "We are a small company compared to our customers so we are more flexible and easy to adapt to our products, working methods and processes and so on." (Malin Nyland, Vice President, R&D Europe)

These capabilities translate to a customer centred focus where market information is more important to F1 in producing a product than having a standardised and universal flagship product.

There was not a lot of individuality when it came to making choices. As Anders Nilsson mentioned earlier, they usually identified a market and a product, and chose a firm to acquire in that market to they get their technology and products. It was similar in India although in this case, they entered via a joint venture. F1 started off with a small R&D division and later expanded to build a much bigger R&D unit to fulfil its strategy to capture the market and develop its product portfolio.

> "We have been looking also at using external companies in India. The decision was taken that we shall instead expand our own resources in India so that they can support Europe and USA." (Anders Nilsson, Senior Vice President R&D)

> "We needed the support from a big group that can help us set up the infrastructure, can help with contacts, can help with investment. All of that made Sirius[15] quite a good choice. I believe at that time the company needed the support of a big partner in India." (Anders Nilsson, Senior Vice President R&D)

Setting up a joint venture and project structure were important decisions in the formation of the R&D centre in India. Forming alliances or making acquisitions speeded up production, development and support because of the ready availability of infrastructure and processes although there is a likelihood of ongoing conflicts between the two partner firms concerning timelines and work deliveries.

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[15] Sirius is an alias.

> "We have a joint ownership. It is 60% us, 40% them but we run it more like 50-50. It's a bit tricky because all investments have to be approved by both companies." (Per Blomberg, R&D Manager, India)

> "We have a project management model we operate against. We have a steering committee for every project. That committee is a mix of people in India and Europe or whoever has a project design responsibility." (Per Blomberg, R&D Manager, India)

F1 has a strong inclination for owning all its assets and IPs and they are in discussions about owning their R&D facility. The decision makers are not sure yet if that is the strategic way forward or if they will continue with the joint venture. There are some differences in work practices and organisation setup that lead to dissimilarities between what comes out from the Swedish and Indian centres. These could result in sub-optimal task development.

> "In India it's a little bit different because you have to follow up and there is a little bit of hierarchy in the organisation. People are not used to taking responsibility for everything." (Per Blomberg, R&D Manager, India)

Swedish organisations usually have a flat management structure in which people are used to taking responsibility on their own. One can assign a task to a person, and one can be sure that it will be completed. Typically in India that need not be the case because with the presence of often strong hierarchies, management control can prove to be somewhat of a bottleneck at times. Another decision maker was a little more candid in her appraisal of the situation.

> "If you have too strong hierarchy where the manager he has all the knowledge and all the power I think you kill the people's skills. They don't learn really and that is the biggest difference." (Malin Nyland, Vice President, R&D Europé)

India is a source of a large number of engineers but that does not always translate to high-quality work or in subject matter expertise. Skills and knowledge are different things as suggested by the quality and knowledge related challenges that the decision makers encountered when starting to

work with the engineers in India. As explained particularly by one decision maker:

> "The importance of maintaining a high level of quality and a stable level of quality is not an understanding in India. It is more like producing to the lowest cost and not with the quality aspect and level." (Malin Nyland, Vice President, R&D Europe)

> "We have only experienced people leave and you have to start up again with new people and teach them again the same things, work process and so on." (Malin Nyland, Vice President, R&D Europe)

The problem is that in India people change companies quickly so there is no real experience being handed over, and there are a lot of new people who join the firms. Someone who has been working there for a certain period of time acquires some experience, and then leaves to go to another company. Few in the market really have deep knowledge because the people move around often, so the depth in expertise is missing. There is thus somewhat of a knowledge gap in India when it comes to this type of work. When it comes to going to India to lower cost, this should only be done once acceptable quality levels have been achieved. Quality need not be compromised to achieve a cost advantage. This of course, is in coherence with the assertion that the Indian market accepts products with lower specifications. In R&D, competence building is a significant task and that would include raising the levels of knowledge expertise and the understanding of quality. These could be some of the potential reasons why innovation is not coming out of the Indian R&D centre as the firm may have hoped. The summary of what the decision makers from firm F1 said is provided in table 17.

Table 17: Firm F1 - Keywords and Messages

MAIN KEYWORDS

Anders Nilsson	***Per Blomberg***	***Malin Nyland***
Proximity and traditional drivers	Traditional and strategic drivers	Traditional drivers
Cluster with competitors	Close to competition	Insufficient knowledge
Evaluate market and portfolio	Inefficient work practices	Customer focussed firm
Form a joint venture	Form a joint venture	Different understanding of quality
Leverage market proximity	Quick product development	Lack of knowledge in the market
Low tech and limited R&D	Simplify the Indian product	Lower specification product
Develop and retain competence	Already existing plants	Agile, size advantage

IMPORTANT MESSAGES

Lower cost should come only when acceptable quality has been achieved

Moving towards agglomeration (internal as well as external) by co-locating R&D with production and local firm networks

Exhibiting a herd behaviour by clustering to benefit from networks established and regional skills developed by others firms

Presence of India specific experience assumes a higher level of contextual knowledge

R&D in India is low-tech and lower quality, and cost focussed only

Perceived difference in the understanding of quality between Sweden and India

Seeking engineering capacity and not engineering capability

Firm F2

The firm F2 was founded in 1999 following a reform in education in Sweden. It was now possible for anyone to operate a free school as long as one was granted a school licence from the school's inspectorate. After getting their permit to operate, F2 started its first school in the year 2000. Today they are running 36 secondary and under-secondary schools in Sweden. F2 has a flagship technology product which is a customisable education software portal that can deliver education worldwide.

> "But one important thing that we have is what we call in English 'the learning portal', where we have all the resources and everything structured in a way that allows for personalised education. And that's something that we built from scratch here in Sweden and that is a really important tool, but the schools are physical schools, the students go there, and interact there but they still have these resources that they can access also from home or anywhere, where they can find everything that they need for their school work." (Sofie Malmgren, Chief Executive Officer)

This portal is a highly personalisable software product that can be customised to suit the differing needs of every individual student. This concept education is an innovative development created by firm F2. F2 is operating in a niche market and has identified a new model for delivering individualised education which can be easily internationalised. The motivation for firm F2 to go abroad is mainly to fulfil a need to modernise education. Their product is a novel solution in an old, standardised industry and their offshore motivations were little to do with lowering of costs or searching for skills, which are some of the traditional reasons associated with offshoring.

> "We believe we need to change how education works around the world, and it is increasingly an issue for governments, for companies if you are a chairman and travel a lot in conferences, so that is a topic that is number one in that how do we fix education, how do we work, and how do we modernise education." (Sofie Malmgren, Chief Executive Officer)

This need for change to the education system was perceived to be applicable especially to developing countries, and it was for this reason that India was a country F2 found interesting. F2 also plans further centres in similar countries to try to change their education systems. F2 plans to use its current models and expand to other countries but India remains the primary focus owing to the market opportunity it offers.

> "But I think right now India is a huge market, so that's one of the main focus areas. So we'll wait a bit before we look at other places like Indonesia or something like that." (Sofie Malmgren, Chief Executive Officer)

Entering India was not too difficult for F2; in many ways it was an easy decision. The interest in India as a sizeable and undeveloped market for their type of product presented an exciting opportunity. The presence of local contacts tended to make the decision easier as many of the associated challenges were not present. In fact, it was possibly the single biggest reason why F2 decided to try to establish a research unit in India.

> "We looked at India, we decided this was an interesting market. But of course it's key that you get the right partner, and this was a person we had some contacts with." (Sofie Malmgren, Chief Executive Officer)

> "Actually it's mainly because of our Indian partner" (Sofie Malmgren, Chief Executive Officer)

Partnering with a local company assumed a high degree of local knowledge and local context which appeared to simplify the internationalisation decision. The presence of local contextual knowledge also tended to reduce the senior management's involvement (and perception of risk) in the decision making. Thus, the presence of local knowledge and contacts appears to be significant to decision making. An important thing to consider here is that, in a market which is underdeveloped with respect to a particular product or technology, it is possible that the opportunity could be overestimated. It can be that with innovative solutions, the target market may not be large enough so potential growth prospects could be slower than estimated.

Market entry is perhaps driven by an assumed gap in the market and the absence of a similar product.

F2's strategic capability lies in its specialised product which is quite a rare product in the market. The engineering skills in India that F2 possesses, appears to be a critical advantage. These are seen by the decision maker as the capabilities of F2 which led to R&D that was centred on developing the specialised product further and to provide an innovative solution to the market.

> "I think we are probably quite unique and we use our team in India for that because the quality is very good." (Sofie Malmgren, Chief Executive Officer)

F2 is a small and relatively unknown brand, at least outside Sweden. The post-entry challenges this caused leads to difficulties in recruiting the correct competencies. A lack of brand awareness in India and F2 not directly being in the technology industry, even though their offering is a technology solution, causes some difficulties in attracting the appropriate personnel and hence has restricted growth to lower than their desired levels. F2 has probably not been good at marketing themselves, and because it is not a traditional IT firm and an unknown brand name outside Sweden, it appeared that most candidates tend to seek employment in larger firms within the IT sector. Getting enough numbers of expert engineers has been an ongoing challenge for F2 which would need to be addressed for F2 to continue to derive value from innovation from its Indian R&D centre.

> "It's difficult to get people to show up for interviews. What is this company? It's not an IT company so it seems they prefer to get a role in an IT company rather than in an educational provider." (Sofie Malmgren, Chief Executive Officer)

The summary of the main keywords emerging from the decision maker in F2 along with the important messages is provided in table 18.

Table 18: Firm F2 - Keywords and Messages

MAIN KEYWORDS
Sofie Malmgren
Opportunity and location drivers
Importance of local context
Product centred R&D
Innovative solution
Brand name challenges
Transform the market
Perceived market opportunity

IMPORTANT MESSAGES
The perception of the market size can be over-estimated for an innovative product
The presence of a local context tends to simplify the decision making for entry
Local knowledge and contacts appear to be significant in decision making
Forming an alliance with a local partner appears to simplify the mode of entry
Unknown brands present challenges in recruitment and growth

Firm F3

F3 is a small information technology company that was established in 2005. The Swedish entrepreneurs, one of whom had an Indian connection, established the Indian centre with a smaller set-up in Sweden. The focus at that time was to get the business operational in India, and to introduce processes for production, quality assurance, human resources and recruitment. After several years in India, the production office became quite self-sufficient, so Swedish management was not needed there as much. Although the decision makers asserted that they had an R&D function, their definitions of what constituted R&D were unclear and fuzzy. F3 is a client-driven firm where they handle R&D projects for their customers. F3 is a services firm delivering solutions for their clients and R&D projects are among them but they do not have any R&D activities for their own products or services.

> "We are a service company. A lot of the companies we work with they do a lot of products and services that require a lot of R&D which we do for them." (Anders Dahl, Chief Operating Officer)

> "All kinds of proof-of-concept R&D and analysis R&D are done here, from basics up to advanced research is happening here. So it depends where the product is, in which phase it is. So the R&D now becomes maybe not platform driven but more market driven that we need to do." (Raj Singh, Chief Executive Officer)

F3 was established in India for the traditional reasons most firms go there: to search for expertise at a competitive cost. It is assumed to be easier to find skilled people in India if the intention is growth. Scalability is not possible in Sweden at the levels that can be achieved in India.

> "Why we are doing it, is because they are having difficulties to find people in Sweden. They want to be more flexible with their teams and to scale up and scale down the teams, on a consultant basis. They want deeper knowledge in an area that they are not finding, or they want a competitive price." (Raj Singh, Chief Executive Officer)

The decision to go to India was easy. Two of the founders had roots in India, and that assumed a greater knowledge about the Indian market and culture. The decision makers perceived a higher degree of comfort with the presence of a rich Indian context. The risk of entering a distant and unknown market was largely mitigated. The ability to leverage Indian context was a significant factor for quick decision making.

> "As two founders had roots India so we felt more comfortable that we know Sweden as a country, we know how they do business, we know the Swedish mentality, and we also do know India as a country, Indian mentality and we sort of felt comfortable in both worlds. As I said, two of them have Indian roots, they have family in India, and we didn't really consider any other place. So it was an easy decision that way." (Anders Dahl, Chief Operating Officer)

A lot of Swedish companies that try to open shop in India usually go through good channels. The Swedish Council has offices in Bangalore and Delhi and provides excellent service to Swedish firms. It does, however,

involve somewhat of a culture shock if there is a Swedish employee who has never been to India before and thus, does not understand the local working culture. The decision makers at F3 already knew the local culture and its intricacies, so they didn't have to cross as big a cultural hurdle as others might have had to. The founders had considered alternative locations to establish their centre. They went on field visits to various locations and also conducted some feasibility studies to aid their decision making. One of the founders developed a thesis in economics to study outsourcing during the 90s and why it was a big failure from the Swedish point of view.

> "We saw it and it was me and 2 other colleagues and we saw that there was a gap in the market in Sweden. This was in 2003 and we made a trip to study, to see the facilities. Feasibility studies in Thailand, India, and Bangladesh. And in India we visited some other cities before deciding to go for Bangalore." (Raj Singh, Chief Executive Officer)

When quizzed about what capabilities the firm possessed, both the decision makers appeared to agree that F3's capabilities are client driven and this led to the R&D being market or customer centred. Although the capabilities discussed by the decision makers are not unique in this industry, it is what they feel is giving them an advantage compared to other firms. F3's R&D orientation is client focused, where they don't have a flagship product or solution but rather understand the client specific needs and produce client specific or proof-of-concept R&D as discussed earlier too. The R&D is not platform driven but more market driven.

> "I am born and raised in Sweden but culturally I have a complete understanding of this country. It's hard to beat the understanding what I have from both sides of the world. So that's the edge, is what I'd like to say." (Raj Singh, Chief Executive Officer)

> "So I think what our unique selling point is and one thing we always hear when we win a proposal, the reason the clients." (Anders Dahl, Chief Operating Officer)

Interestingly, F3 is delivering R&D to provide high quality solutions for the Swedish market from the Indian R&D centre but this has proven to be a

challenge owing to quality issues that emerge from the activities handled from the Indian facility.

> "Sweden is a country that has remarkably high expectations in quality standards when it comes it R&D and we understand that." (Anders Dahl, Chief Operating Officer)

> "The difference between high and low in Sweden, the spectrum between a good developer and a bad developer in Sweden is quite narrow. The difference range between what is a good developer in India and a bad developer is a lot larger. You even wonder how they graduated from their degrees but there are also people that google wants to hire. The spectrum is so much larger in everything in India." (Anders Dahl, Chief Operating Officer)

Differences in quality and contextual knowledge were two major challenges faced by F3 in India. When a firm goes to India in search of skills, the assumption is of high-quality skills. India does provide engineers in sheer numbers, but often the competence level may come with different expectations. The perception of high quality is very different between Swedish engineers and their Indian counterparts. The quality level that the Swedish clients demand is very high and the engineering capabilities in Sweden are globally known. It makes hiring challenges much harder in India especially as F3 is not a renowned brand even in Sweden.

F3 is a small technology firm and the decision makers believed that being in this sector somewhat mitigates issues that may be related to physical distances. Distance didn't play a significant role in either decision making or in operational issues.

> "We are quite lucky to work in IT, because IT allows you to work regardless of geographical location. You're not delivering anything physical, you're delivering code that can be placed in a repository that can be accessed anywhere in the world." (Anders Dahl, Chief Operating Officer)

Because they are a service firm and don't have their own products but provide resources to other firms for their R&D projects, F3 does not have the problem of product visibility. Everyone can access the product which is

intangible and can view the same thing from any location in the world. The summary of what the decision makers said is provided in table 19:

Table 19: Firm F3 - Keywords and Messages

MAIN KEYWORDS	
Raj Singh	***Anders Dahl***
Scaleability and expertise	Resourcing drivers
India contextual experience	Easy decision to offshore
Fuzzy R&D definition	Utilise Indian market, country knowledge
Market driven R&D	Competence, knowledge, quality gaps
Individual decision making	Client driven R&D
Indian IT history	Distance is not significant

IMPORTANT MESSAGES
The presence of an Indian context tends to provide an easier decision
Distance does not appear to be significant in IT related R&D projects
Client driven R&D appears to be fuzzier in definition than product driven R&D
Presence of India specific background inspires higher confidence
Differences in quality between Sweden and India remains a challenge

Firm F4

F4 is a large manufacturing firm that produces trucks and commercial vehicles. It had established an R&D facility in India in 2013. It already had a production unit in India and a network of suppliers and contractors. Since there was already a small establishment in India, the decision makers decided to set up an R&D division. Controlling activities from Sweden was proving to be a challenge so one of the main reasons for locating the R&D in India was to have R&D staff in close contact with the market, the customer, and the suppliers. It was assumed that being close to the unfamiliar markets reduced the exposure from lack of knowledge about the possibilities of the opportunities in the host country. Thus, proximity drivers appear to be the primary motivation for establishing R&D in India.

> "I have had an idea at least that if we could have R&D persons sitting close to the market, to the customers but also close to the local suppliers in Asia we would gain much more knowledge about the reality and possibilities within R&D." (Stefan Lind, Senior Vice President, R&D)

Among the decision makers, their reasons varied from cost drivers to opportunity drivers, perhaps depending on the importance the individual attached to the motivation for moving.

> "I was a little bit involved in this [the decision to offshore]. The first thing we did was actually we worked with this office in India. I don't know but I think one reason could be that it's a high potential country and a huge market and wanted to get a feel for the engineering capacity here." (Mats Eriksson, Director R&D, India)

Mats Eriksson is the R&D engineering manager and the head of the India centre. He is closely connected with the local operations, so perhaps his motivation was primarily a search for a large number of good quality engineers. Stefan Lind who is the overall R&D head and perhaps less connected with the day to day engineering functions appeared more interested in the strategic functioning of the India centre. His motivations were somewhat different.

> "So the first reason was cost, the second reason was lack of resources in the region of Stockholm and third was the knowledge bank that could be utilised from the customer point of view and the supplied point of view." (Stefan Lind, Senior Vice President, R&D)

There was a high perceived opportunity cost of not being in India and a threat of losing out to competition. The 'fear' of not being in India was possibly greater than the scale of the opportunity that India offered, and other benefits from resources and costs. This could have resulted in making a decision in some haste and not achieving a consensus in the motives to establish R&D in India. When decision makers perceive an action that is more a necessity than it is a requirement, then it can potentially lead to a decision that may neither be consensual nor logic driven.

"And there aren't new markets and everyone says we need to go and we need to be in emerging markets in Asia and Asia is China and India. We must be there; we don't dare to not be there but really how?" (Johanna Larsson, Head, Product Support, R&D)

"…but someone realised that we need to do it in India, we need to have some R&D resources there and then connect it back to Sweden and that's why we need this organisation." (Johanna Larsson, Head, Product Support, R&D)

Placing R&D close to the production unit is an indication of a degree of internal agglomeration which helps firms that co-locate its functions to improve efficiency and to minimise internal overheads. The firm is not performing innovation led R&D offshore. It is just producing re-development and product adaptations to suit the 'simpler' requirements of the Indian market.

"For the moment we don't do really advanced engineering functions here in India. It's mainly more basic functions. I think there are two issues: we are very centralised when it comes to our R&D competence. The other reason why we didn't have more high tech work is because we are quite new to India and are getting experienced." (Mats Eriksson, Director R&D, India)

"The main reason was probably to learn what we can do to simplify these products for such markets." (Stefan Lind, Senior Vice President, R&D)

"And to do the design more let's say simple, I prefer to say robust not cheap like bad, but it's the language here. Robust and simple enough for those needs and so on." (Johanna Larsson, Head, Product Support, R&D)

There is also a problem with distance that leads to a perceived loss of control and efficiency. This is possibly a characteristic for manufacturing firms but it can cause a lack of confidence in the R&D activities at the offshore location.

"But there is somewhat complicating life with the long distance and communication problems I suppose. So you lose some of the efficiency you could have had by having a person on spot here." (Stefan Lind, Senior Vice President, R&D)

This also manifests in the engineers in India never actually seeing the full product. This doesn't help in either knowledge or confidence-building measures. A large geographical distance could accentuate this problem concerning product visibility.

> "I can also understand that the people working like that in India never seeing the product, never meeting other people working with." (Johanna Larsson, Head, Product Support, R&D)

F4's R&D is quite centralised and is retained in Sweden. As a result they have some limited R&D activity in India which is mainly cost-savings driven. Being centralised it appears quite difficult to offshore R&D.

> "We're really centralised. So that's why it's hard to take part of R&D and move outside." (Johanna Larsson, Head, Product Support, R&D)

> "It is somewhat difficult to outsource this type of work and much easier to have that close to your head office. So there we had problems to outsource. But we are somewhat into on-board IT or embedded system IT development also. But basically it is mechanical engineering and calculations based on the design that they do." (Stefan Lind, Senior Vice President, R&D)

F4 appeared to have offshored to India primarily to bring down cost because no innovation is being sourced out from India. The R&D is composed of simple, low technology work and is a means of saving costs. Decision makers in F4 suggested that the firm is very good at understanding the customer and satisfying customer needs quickly with customisable products suited for them.

> "The components we develop have interfaces that are clearly defined so they can fit to each other and you can combine products targeting each and every customer in a unique way by using standardised components and combining in a new way like Lego." (Stefan Lind, Senior Vice President, R&D)

> "From R&D or technical perspective, it's very special and lot of other companies try to copy. [We understand the market] It makes it possible to do many

> different truck models with few parts." (Johanna Larsson, Head, Product Support, R&D)

The decision to go offshore was somewhat complex. India was an unfamiliar market for F4 in which they had no prior experience. They had offshoring experience to other countries which seemed to give the decision makers some confidence. India is also quite far in terms of 'sheer distance' and this factor made the decision magnitude somewhat large. Although there was some freedom to make decisions, it involved the executive board, and decisions were taken at the highest level.

> "And then someone decided and it was on the executive board level, we need to be there, India will be growing. So to do the industrial establishment was on one level, let's say the board level like discussing China. We don't really know." (Johanna Larsson, Head, Product Support, R&D)

> "I would say the decision process as we have given our R&D managers freedom to seek resources wherever we can get them for a good price. So, I don't have to go to the President to ask for permission, but of course I do inform the executive management that we are trying out the possibility to use resources in India." (Stefan Lind, Senior Vice President, R&D)

F4 started operations in India by partnering with resources from an Indian firm although it started to minimise the alliance by using its own resources. One of F4's key strategies is to own its own businesses overseas, so a fully owned subsidiary is a core concept of F4. This was an important reason why India was an easier destination than other locations in Asia, particularly China where joint development (something the managers of F4 were not too keen on) is a regulation. They utilised the presence of their existing suppliers in India and allied with them by contracting out their resources. This was the easiest solution to start the R&D.

> "They were our distributor in India, distributing trucks at the time. One branch of their activities was consulting activities towards engineering products and towards IT products. So that was quite natural that we had a chat with them. It was even that they approached us saying that we have those skills, are you interested." (Stefan Lind, Senior Vice President, R&D)

> "We work with the third party and that is also part of the reason why we're allowed to setup your own company and not in China for example where you can work more with JDs [joint development] and so on. So that might also be why we started here." (Mats Eriksson, Director R&D, India)

By allying with an existing supplier, F4 also possibly tried to increase its speed to market by cutting out the time it usually takes to establish infrastructure. Owning its factory is important to F4. Once it had a foothold in India, it began to increase the employee presence in India by starting to minimise the third party contractual work.

> "We want to own our own factory and the companies have a majority ownership. Some in India is owned by Aries[16] but we've started to take it back." (Johanna Larsson, Head, Product Support, R&D)

F4's R&D in India is quite basic. F4 is highly centralised in its R&D and that has also been one of its biggest challenges. The decision makers, however, felt the need to try something in India. This was largely because of a perceived cost saving and also perhaps the lure of getting close to a market that was distant but very large. They started small with a pilot project to test the waters in an unfamiliar market.

> "Then we did send personnel from IT and from R&D to look into their skills and their resources and the activities, doing some due diligence of the company as such. We received quite positive response from those visiting this company. Then was said on the R&D side, ok let's make a try out." (Stefan Lind, Senior Vice President, R&D)

> "I think because it was such a big decision we made it very smooth by let's make a pilot, let's take a couple of, nothing is happening. If you go out ask everyone responsible for some parts of the truck they're really busy with lots of other things. Yes we have 100 trucks in India, please make a very cheap version of this suitable for Indian market." (Johanna Larsson, Head, Product Support, R&D)

[16] Aries is an alias.

Starting small was a way to build knowledge and test the capability in the host location. It was also difficult to offshore short-cycle R&D as a decision maker mentioned, and this possibly was also a reason for a tentative start. There were several challenges and dilemmas in operating from India. Because the Indian product was quite simple compared to the European offering, a degree of 'unlearning' was required to understand the simpler market needs. This was something F4 is not used to, as it is a very technology aware and intensive firm. The Indian market is not advanced enough to accept the European sophistication in this product and reconciling their mindset required quite an effort.

> "We always try to do something better, next generation is a bit more high end. It's a simplified explanation but to really make people understand here, that for low volume, very much man hours, not automised, not very easy to produce, make it rough and simple. To go in that direction it's really hard!" (Johanna Larsson, Head, Product Support, R&D)

> "Because you can imagine that as a designer in Europe, we're used to high technology products or electronics into the product, the surfaces are smoother, come with cooler material and so on. They just want to make more and more fancy products. But it's very difficult to change their mind set to make a simpler product." (Mats Eriksson, Director R&D, India)

Differences in quality and knowledge were two other major challenges faced by F4 in India. When a firm goes to India in search of skills, the assumption is of high-quality skills. India does provide engineers in large numbers but it is possible that the competency level may come with different expectations. In R&D, even if the tasks are basic, knowledge is a crucial commodity. This can be achieved in part by a combination of education and experience, which at times may not always be that good in India. The quality issues are not only restricted to the engineers, but also to external vendors and suppliers.

> "We also soon understood that we need some our own people even if they are locally hired, there is a difference between consultants and our hired people maybe mostly in continuous education and also the context to Sweden." (Johanna Larsson, Head, Product Support, R&D)

"I would say the biggest challenge is quality, how you see quality. It's so different from Europe. What you perceive towards buyers and also towards suppliers. You can't just expect to say to the buyer that ok I expect to deliver at this date. You need to be there." (Mats Eriksson, Director R&D, India)

Table 20: Firm F4 - Keywords and Messages

MAIN KEYWORDS

Stefan Lind	***Johanna Larsson***	***Mats Eriksson***
Proximity and cost drivers	Cheap design in India	Good engineering capacity
Searching for knowledge	Need to be in India	Proximity and cost drivers
Safeguard the design	Difficult to offshore part of R&D	Unlearning
Reduction of efficiency	Simple product	Difficult to simplify product
Difficult to offshore short cycle R&D	Understand the market	Low tech R&D
Distance to market is a disadvantage	Product visibility	Existing Indian context
Seek lower cost, more skills	Learning and quality dissimilarities	Understanding of quality

IMPORTANT MESSAGES

There is a perceived opportunity cost of not being in India. There is a 'need' for being in India.

There is a move towards clustering by co-locating R&D with production and local firm networks.

R&D in India is limited and simple, and cost-driven.

Seeking engineering capacity and not engineering capability.

Confidence challenges appear to result from an unclear R&D vision, quality and knowledge issues

Distance appears to be a significant factor for management and operations

Difficulty to offload R&D from centralised firms

Firm F5

Firm F5 is a relatively small manufacturing firm that produces multi-industry solutions in machine tools for drilling and cutting. F5 established an R&D facility in India in 2011. Talking to the decision makers, it appeared that, because there was already a large production unit operating in India, there was a need to support this production with designs and drawing updates.

> "Well we have facilities there, we obviously have sales force there. The motivation in India as far as R&D is to sell, there's a market there. To colocate this facility with the manufacturing unit is actually beneficial for development purposes." (Erik Borg, Senior R&D Manager)

> "Number one is emerging markets because long term India and China are one of the big contributors of market share, so we thought we should have R&D here in India because we had not so good impression of China so we thought India is the right place to have it." (Ajay Mehta, General Manager, R&D India)

There was a need to be in India because of a perceived high opportunity cost. There was some lack of clarity regarding the R&D vision and what to do in India even though there appeared to be a consensus to go to India. Even though firm F5 has a global R&D strategy and vision, it would have been worthwhile to have a 'roadmap' for what they hoped to achieve from being in India. Market seeking motives were strong drivers.

> "New product development in a segment or area that are very strong in India or Asia and also looking at how we can adapt our existing product to better fit into the emerging markets." (Erik Borg, Senior R&D Manager)

> "I joined the company in 2011 and then we really started digging into what we want to do and where and why." (Mats Olsson, Vice President, R&D)

> "Now we agreed to have R&D but what are the things we should do in R&D because we need to have some kind of clarity, some kind of handshake and some kind of ownership." (Ajay Mehta, General Manager, R&D India)

The primary drivers for establishing an R&D centre in India were the traditional drivers of optimising cost and availability of large numbers of skilled engineers. In addition, being close to production was an important motive that would enhance development. Thus, proximity drivers were also reasons for setting up a facility in India. So, it was important to place the R&D close to production and to get the work done at a lower cost than in Sweden. F5 also considered India to be a strategic choice to develop an emerging market model of production. Placing R&D close to the production unit is an indication of a degree of agglomeration which is when a firm seeks to co-locate its functions for efficiency reasons.

> "To co-locate this facility with the manufacturing unit is actually beneficial for development purposes. But as I said before, the reason that we put R&D there is mainly the talent pool in certain areas, the skills set that you will find." (Mats Olsson, Vice President, R&D)

> "…how to leverage the talent of India. I won't say cost effective, but I will say leveraging the talent of India. We have a big talent pool, we know Pune is the centre of education, an educational hub." (Ajay Mehta, General Manager, R&D India)

> "So they put their trust in me, then we started focussing on two principles: number one is emerging markets because long term India and China are one of the big contributors of market share, so we thought we should have R&D here in India... Number two is the cost effectiveness, because setting up this kind of facility is very expensive somewhere else, so these were the two driving forces for us, that is emerging markets and low cost countries." (Ajay Mehta, General Manager, R&D India)

The decision process was based on a long-term emerging country strategy where decisions were made concerning a location strategy, activity choice, management structure, and future ambitions from the offshore centre. The location decision was an evaluation between India and China. China was considered unsuitable because of a higher cost base, the lack of a manufacturing unit, and a lack of transparency in policies.

> "The cost factors were 1 to 2 or 1 to 2.5. I'm talking in 2007, from right off my head. But the cost factor has really grown to China's disadvantage over the years and today qualified personnel in China are almost as expensive as in any developed country. Also, at that point we did not have any manufacturing centre in China, so it was decided to co-locate it with an already existing manufacturing facility in India." (Erik Borg, Senior R&D Manager)

Firm F5 bought a local Indian company to acquire an R&D facility and benefit from an existing infrastructure. The facility is now a fully owned subsidiary of F5 and closely integrated with the already existing manufacturing unit. There is a degree in work separation as mature R&D (in Sweden) focuses on new innovations, idea generation, and idea exploration while the Indian R&D is concentrated on the established product.

> "The factory [Sweden] will focus much on milling and other high end products while India will focus on stationary products. So instead of introducing lot of products there are a lot of projects we handle through this maintenance phase." (Ajay Mehta, General Manager, R&D India)

> "Today we are focussing much on product development and information on product development. These are the two core areas for us." (Ajay Mehta, General Manager, R&D India)

The ambitions were to build economies of scale and to develop the Indian centre into a regional emerging country hub for R&D and production. When firms such as F5 choose India as a preferred location, it is possibly a result of clustering. Clustering of firms with similar products suggests the tendency of legitimising the decision to offshore. The rationale is that if other similar firms are there, then there must be skilled resources and a pool of ready knowledge available. This may not always be the case as suggested by challenges faced by the technology and knowledge gaps that the decision makers encountered when starting to work with the engineers in India. This is a common sentiment that was echoed by all the decision makers.

> "There were several challenges. Number one is technical gap because since we are in the steps of developing this R&D so knowledge of the whole lifecycle.

> Until a person works on something, they don't understand the product completely and the application of it. The second challenge in in retention." (Ajay Mehta, General Manager, R&D India)

> "We have some issues in quality problems. We always have this little bit that India is a threat, and one of the problems is the difficulty to offload work to India. To know what you have but also to know what you are getting back. So this is the change management part that is difficult. Also depending on the colleagues, any problems they have to be passed back and updated. So it's up to the managers and to do the quality check up on a regular basis." (Erik Borg, Senior R&D Manager)

Some of the tasks at the offshore centre were related to competence building and capability building. The firm is in effect seeking out capacity (in numbers) to fulfil economies of scale and not capability which is learned over time and access to knowledge. As explained by the decision makers, the R&D in firm F5 in India is essentially product development activities along with some design and product maintenance for the established and mature processes. The R&D being performed was established work and non-disruptive. Although one major motivation to perform R&D from India was the availability of competence, sometimes the quality of that competence was somewhat of an issue. This is a tussle between capacity and capability.

> "One was that we saw a need for building competence in certain areas where the competence pool in India was slightly better suited to do that than the competence pools that were available in other locations." (Mats Olsson, Vice President, R&D)

> "But I'd say the confidence in the product knowledge build up has probably been the toughest thing to cope with. The competence build up and getting that to work with the other established centres." (Mats Olsson, Vice President, R&D)

This suggests that although engineering skill is highly sought after in India, its utilisation is perhaps not optimal because the resources are possibly not being used in activities that are innovative and technology intensive. This

could also be a result of the poorer quality that is perceived to be coming out of India.

There is a tendency to exhibit a degree of individualism in decision making when there is a previous experience of offshoring either at firm level or at the individual manager's level, or if one of the decision making group has a connection with India, either from work experience there or simply by being an Indian. An 'Indian' presence assumes a greater local knowledge of India and hence a higher confidence level and optimism in the decision to offshore. This suggests that the decisions acquire a degree of legitimisation when there is the presence of contextual knowledge and prior experience. The legitimisation for going offshore could also be based on the presence of other similar competing firms.

> "Like automobiles, we have 3 big automobile companies near us. We have a vendor of aerospace which is in Nasik which is 200 km away from us. We have other manufacturing companies nearby. So these make it a good choice to be here based in Pune. We can have lot of co-ordination with the industry." (Ajay Mehta, General Manager, R&D India)

> "I had a thought or vision. This maintenance concept I hold up and convince people in Sweden that as a mature R&D organisation you are not focussing, you are focussing much on introducing new products, new concepts so why don't we take this to Pune where we can start developing people because when they work with established product they have lot of technology, lot of ideas on the table so they can go through it, they can understand it." (Ajay Mehta, General Manager, R&D India)

The summary of what the decision makers from firm F5 said and the important messages that emerge, is provided in table 21.

Table 21: Firm F5 - Keywords and Messages

MAIN KEYWORDS

Erik Borg	***Mats Olsson***	***Ajay Mehta***
Proximity and traditional drivers	Proximity and traditional drivers	Proximity and traditional drivers
Existing presence in India	Close to production	Agglomeration and clustering
Product development	Knowledge gaps	Find quality at cheaper costs
Support global R&D	Confidence challenges	Perform established R&D tasks
Seeking presence in Asia	Competence issues	Knowledge retention
Capability and quality gaps	Capability and capacity tussle	Gap in competence
Difficult to offload high-tech/risk work		Confidence challenges
		The need to be in India

IMPORTANT MESSAGES

There is a perceived opportunity cost of not being in India. A 'need' for being in India.

Exhibiting a herd behaviour by clustering to benefit from networks established and regional skills developed by other firms.

Presence of India specific experience assumes a higher level of contextual knowledge.

R&D in India is non-disruptive, not innovation-driven but quality-driven.

Seeking decision legitimisation by clustering and the presence of Indian contextual experience.

Seeking engineering capacity and not engineering capability.

Confidence challenges appear to result from product knowledge and technical competence gaps.

Firm F6

F6 is a large technology firm founded in Stockholm almost 140 years ago. Its services, software and infrastructure enable the communications industry and other sectors to improve their business. Today, F6 is present in about 180 countries with the Indian operations being one of its largest facilities. F6 was among Europe's first international companies and it was one of Sweden's first companies in India. Expansion has remained its core philosophy since its foundation.

The R&D F6 performs in India remains a somewhat low technology activity and there is a need to remain strongly centralised by retaining the critical activities in Sweden. Even though the Indian unit is F6's largest production and service centre worldwide, the R&D centre is relatively small and performs a support function; R&D in F6 is a somewhat fuzzy term.

> "There are certain things we want to keep central so we sit in a very long term competence and communication in Sweden." (Lars Wilander, Vice President, Infrastructure)

> "I would say for India, in my mind we have never put anything on the front edge of development. It has always been things that are a little set or maintenance lifecycle positions. Not really at the forefront of things." (Lars Olsson, Manager)

> "We misuse the word R&D and in daily terms we say R&D for design activities" (Jan Olofsson, Head, Technology Supply)

F6 has R&D in both products and services. They define R&D in its corporate business as simply the development that is creating applications that can be sold in a repetitive form, to develop the software and sell it to many customers. F6's R&D centre is essentially product development, and they don't have that much research or the 'R' part. The R&D site in India is relatively small so that is a possible reason as well that there is less strategic R&D work and more of design work.

The decision makers in F6 were in agreement about the reasons why they chose to offshore the R&D to India; there are still the 'obvious' cost

and availability drivers. India has a reputation for still offering a lower hourly rate than perhaps other countries and decision makers are still tempted to use past trends of similar cost-savings led offshoring as a trigger.

> "They have a very large young population. India is the youngest country in the world which is striving for improvement. They have the ability to produce engineers, computer science graduates in volumes that cannot be matched by any other country in the world and are ready to get into the job market. They speak English and therefore they offer an unbelievable and unbeatable platform for scalability because you bring them in at an extremely competitive cost." (Alex Jonsson, President, India region)

> "First of all is the obvious one for cost. We have lower hourly rates and therefore we get a cheaper product. So that's the number one driver. And the second piece would be for flexibility. Ideally R&D is a pretty steady business, you decide to do R&D and you stay in that because you've had the competences so long that it's bad to go up and down in R&D. And then the third reason is a bit more specific but for certain new areas we might want to tap into an ecosystem." (Lars Wilander, Vice President, Infrastructure)

> "I think in general we are not much different from other firms in our industry. It has been driven by cost saving activities mostly. It still is for some reasons but we are getting more sophisticated if you like." (Jan Olofsson, Head, Technology Supply)

The offshoring market has evolved a lot more and now when there is competition in capabilities the cost levels start to adjust and it is not so cheap anymore. Most offshoring is to India, China, and Eastern Europe; China is now almost at East European levels in terms of labour costs while India is also quickly going up. The benefit received by just looking at cost is shrinking. Firms may need to look beyond cost as an 'obvious' factor. Clustering of firms with similar products suggests the tendency of legitimising the decision to offshore. The logic of an 'ecosystem' is that if other similar firms are there, then there must be large volumes of skilled resources. Decision makers use the reputation of the location, past trends, and the existence of other similar firms in justifying their decisions to move abroad.

F6's capability in the eyes of its decision makers is essentially the specialised product which does not change much from market to market, but

rather it is the ability they have to quickly put their products on the market as a result of their organisational and process capabilities.

> "Where our competitive advantage is sitting is on processes, methods, and tools." (Alex Jonsson, President, India region)

> "We have very fast time to market, particularly for complex products." (Lars Wilander, Vice President, Infrastructure)

> "We do R&D on a global approach and we don't want to deviate to local requirements too much. That is our strength." (Lars Wilander, Vice President, Infrastructure)

> "I mean it could be our people capabilities, infrastructure capabilities." (Jan Olofsson, Head, Technology Supply)

The decision process was based on evaluations using business cases and decision tools where a potential technology opportunity is identified and due diligence is done to assess the opportunity. Decision makers at F6 considered buying other firms to acquire their R&D but the costs proved to be prohibitive. The decision to offshore the R&D was taken at an executive level and it was a formal and complex process. This may have been because F6 is a large firm and can have several decision making levels.

> "It was taken at a very high level and the process we considered was even a make-or-buy decision. We were looking at potential acquisitions then we ended up deciding to potentially save the money and time by doing it ourselves." (Lars Wilander, Vice President, Infrastructure)

> "We looked first at acquisitions but the price of companies we were looking at was astronomical and then we started to evaluate an alternative path if we did it ourselves and then we made a make-buy analysis, and we looked at the synergies of creating this entity and possibility of making India an R&D facility and then analysing cost versus benefit." (Alex Jonsson, President, India region)

> "We are quite a large, distributed organisation so there are a lot of decision points." (Jan Olofsson, Head, Technology Supply)

At the base of their decision making was quite a clear belief that India was giving scale volumes and it is quite evident from trends over the last 2-3 decades that India is a hub especially for ICT R&D and services. According to the decision makers, India possessed both a demographic and language advantage with higher numbers of qualified young people who speak English which is the worldwide language of research activities. With this scale advantage it is also possible to be operational from day one in India.

> "You have many global companies that have established their R&D centre or service centre in India for this reason." (Alex Jonsson, President, India region)

> "There is strong education, strong English, strong middle class, and good IT knowledge. That's why IBM, Microsoft all go there because if you do the right things then you can become a good outsourcing partner." (Lars Olsson, Manager)

Although India provides large numbers of educated and skilled engineers, and there is ready technology infrastructure and an industry ecosystem that can be accessed, there is still the tussle between numbers and quality, between capacity and capability. This is a consistent message echoed by the decision makers of firm F6.

> "I think the supply of competence is higher but there's also much more attrition, so there's higher turnover. I would say right now that the competence isn't really higher." (Lars Wilander, Vice President, Infrastructure)

> "A lot of Indian firms work in a way that there is a lot of rotation so an engineer works for 6 months with one project then 6 months in another and so on. That does not work for us because we need to build up competence so we need that they stick around for a long time because we have very complex products." (Lars Olsson, Manager)

This lack of quality in competency is a common theme also found in other firms discussed in this study. In F6's case also it is proving to be a hindrance to achieving its optimal value in innovation. Competency development and competency retention are different things and both need to be taken care of to allow progress of the offshore R&D centre. High attrition

rates also have a problem when it comes to trust issues. When employees are in a position for a longer period, they tend to develop more expertise and are usually trusted with crucial information, and the part that tends to be less loyal handles information that is less critical. This tends to lead to knowledge fragmentation within the organisation; this can hinder the production of innovation. Competence and knowledge dissimilarities are two inhibiting factors that potentially slow down the advancement of innovation at the offshore R&D centre.

> "Because attrition is high, so you need to keep critical knowledge with the more loyal part in the organisation." (Alex Jonsson, President, India region)

> "Of course you open up a high level of needed knowledge but this was a crucial point and still when I meet the suppliers this thing comes back even now." (Lars Olsson, Manager)

The perspectives of the decision makers and what their views suggest are shown in table 22.

Table 22: Firm F6 - Keywords and Messages

MAIN KEYWORDS

Alex Jonsson	***Lars Wilander***
Cost and availability drivers	Cost and availability drivers
Product focussed, low-tech R&D	Accessing clusters and ecosystems
Need to retain core in Sweden	Decision for low tech work
Decisions based on trends, experience, cost	Need to be centralised
High level committee decision	Use previous offshoring experience
Use previous offshoring experience	Competency challenges
Knowledge issues	Standard global product
Lars Olsson	***Jan Olofsson***
Cost and availability drivers	Cost and availability drivers
Neep to keep 'R' internal	Design activities
Decision for low tech work	Complex decision making
Decisions based on 'obvious' choices	People and infrastructure capabilities
Competency challenges	
Depth of knowledge challenges	

IMPORTANT MESSAGES:

Tussle between supply and quality of competence

There is a perceived need to retain sensitive and core R&D in Sweden

R&D in India is limited and simple, and essentially cost-driven

Distance does not appear to be a significant factor and there is full product visibility

Decisions seem to be based on 'obvious' choices from past trends and prior experience

Low tech work indicates possible lack of confidence in the competence

There is a challenge with the depth of knowledge with the engineers in India

Firm F7

F7 is a small technology firm with a flagship product on the mobile platform. F7 developed a global directory search application which was a radical innovation at the time with complete telephone functionality and social media integration. With its crowdsourced database development, it is now available in all countries and across all mobile operating systems. Founded in 2009 in Stockholm it has grown to have a user base of more than 100 million mobile phone customers. F7 entered India in 2015 and is now its biggest market where it is aiming to gain an additional 150 million users.

F7 chose not to offshore its conventional R&D to India despite India having a reputation of providing highly skilled engineers in the technology domains. It performs ad-hoc R&D projects from its India centre.

> "Firstly we are a lot smaller, we have fewer resources, and our team sizes are much smaller. We are working on a much more focussed area. For us the decision was more about keeping the efficiency. What I mean by that is that there is always an overhead if we have remote offices. Overall we actually prefer to have a tight loop and working together in the office as a production team. We don't really have too much work, too much tedious work to outsource. We have more product innovations type of work so that's why we need team players, people who would actually join us [here]" (Adam Berg, Chief Technology Officer)

Because of its small size, the amount of investment needed in India might be much larger than what could be justified. Recruiting more people abroad could incur larger overheads and if the firm's strategy is to innovate while staying small, then the investment may not be profitable. Also, the need to retain core activities in Sweden is an important theme, when considering moving some of the R&D abroad. Echoing some of the thoughts of other decision makers from other firms, R&D abroad (especially in India), often involves lower risk and lower sensitivity R&D tasks. If it is crucial to retain the core research in Sweden and there are not enough routine activities to take away, then going abroad may not make much strategic sense. This view of centralised research and the need to retain it in Sweden was also endorsed by Ram Prasad, Managing Director, India.

> "We want to be very centralised. Product development and engineering – you can't split it. I think our [research] effort will always be in Sweden but as we grow we will see on a needs basis how we want to expand that." (Ram Prasad, Managing Director, India)

F7 does have a presence in India but it is for sales, marketing, and business development, and some ad-hoc R&D activities. Their product is global and can be accessed from anywhere via a mobile phone, they don't perceive a need to co-locate any R&D or technology team in India and because they don't feel the need to bring down costs, one traditional reason to be in India is eliminated.

> "We have R&D in India. What we do in India is we do a tremendous level of research. We go to the market ourselves, we go to customers. Their work is reflected on the data and data quality." (Ram Prasad, Managing Director, India)

F7 did want to take advantage of India's promise of a large user base and wanted to maintain their presence in India. It was not the fear of missing out on the opportunity but rather the importance of retaining their focus there. F7 has a single market focus where they want to maintain their position of being the top provider of their mobile solution in the country.

> "For us the main focus is on India. We don't want to lose focus by thinking that we are doing well in this market so let's move to another one. It's not the fear that we lose another market but it's important we move from strength to strength and at the same time look at other markets in parallel." (Ram Prasad, Managing Director, India)

Decision making was quick and tended to be quite individualistic. This is possibly a result of being a small firm in which almost all the employees are physically located in Stockholm, so perhaps there are not many levels of decision making requirements. As Adam Berg, Chief Technology Officer, explained (in a quote earlier) there is an overhead in having remote offices; decision makers at F7 believed in making decisions on the basis of keeping efficiency.

> "For efficiency reasons we don't want to ramp up our team because we don't want to have disconnect between the offices. It was an easy decision and that's a decision that at least for our stage of the company, that's a decision I take as the engineering lead. It's not a committee decision." (Adam Berg, Chief Technology Officer)

F7 is a product focussed firm where both their activities and their capabilities are entrenched in a product driven and product excellence path. They have the same offering all over the world which can be downloaded to any mobile platform. This may also explain somewhat why they considered it important to keep most of the R&D close to or inside the headquarters. It is perceived to be quite difficult to offshore high technology, product focussed R&D.

> "We are working on a much more focussed area." (Adam Berg, Chief Technology Officer)

> "So, our capability is our product, is what we believe is going to be the game changer for us." (Ram Prasad, Managing Director, India)

The individual decision making based on expertise or contextual knowledge is similar to the view offered by the second decision maker. Taking the decision making out of the hands of the "boss" and into the decision maker's could lead to an individualistic approach based on perhaps a greater understanding of the decision choices.

> "You can have n points of data in front of you but I think the managers need to take the decisions out of their boss' hands. It is about how the manager understands the data, simulates the data. You can't just give a recommendation because that is very slow. So the decision has to come from someone who says this is what I found, this is what the solution is and this is where we should do it." (Ram Prasad, Managing Director, India)

In the end, the strong inclination to remain centralised and to retain core R&D in Sweden coupled with the lack or absence of low risk, routine activities simplified the decision making to offshore the R&D. This resulted in F7 not facing a lot of the 'obvious' cultural, competence, quality, and effi-

ciency challenges that were experienced by some other firms in this study. To this end, the decisions made to innovate locally in Sweden appeared systematically thought out. But this could also have been made easier by the fact that F7 is small in size and has only one product that can easily be made available anywhere. Also, a lack of ready knowledge in the market is somewhat of a detriment to some knowledge intensive firms. This wasn't really a problem for F7 as they have not invested heavily in India as they have only ad-hoc R&D activities sourced from India.

> "But a lot of companies in India for example, they don't really invest in [knowledge]. They are ok with putting minimal effort in tools and techniques, so it is very hard to find people having that knowledge already." (Adam Berg, Chief Technology Officer)

> "If we recruit someone from Sweden or the USA, they already know all those things so it was a bit of a learning curve for that team." (Ram Prasad, Managing Director, India)

Finding good quality knowledge resources was a challenge for F7 because their product uses technology that not many engineers in India had worked with or seen before and also perhaps due to the general level of skills in the Indian resources; such a scenario has also been discussed by decision makers in other firms in this study. It did not affect F7 as much because the type of R&D they do in India does not require the skills they believed were hard to find. Core R&D in F7 is still done from Sweden, as has been discussed earlier.

The summary of what the two decision makers from firm F7 said and what it could suggest is provided in table 23.

Table 23: Firm F7 - Keywords and Messages

MAIN KEYWORDS	
Adam Berg	***Ram Prasad***
Seek efficiency	Retain core in Sweden
Offshore overheads	One market focus
Need to be tightly coupled	Learn from market
No low tech work	Learn from customer
Individual decision making	Need to be centralised
Distance v efficiency	Data research activities

IMPORTANT MESSAGES
The need to remain centralised is significant
Offshoring R&D assumes low tech work in India
Data, learning and knowledge challenges are factors in India
Retaining development and core functions in Sweden appears to be crucial
Decision making was easy and individualistic

Firm F8

F8 is a large manufacturing firm and has been manufacturing trucks for almost 100 years now. Its trucks are sold and serviced in more than 140 countries all over the world. Sometime in 1995, the decision was taken to establish a factory in India when they initially started to export kits from Sweden to meet the demand from the Indian market though mainly for mining purposes only. R&D was established once the production factory was operational and stabilised. The decision to have an R&D function appeared to be an individual decision taken by the R&D head, as suggested by Stefan Eriksson, Senior Vice President R&D, himself.

> "But then in 2003 I made a decision that we should look to establish an R&D function in India separated from the factory. That wasn't an R&D function; it was part of the global R&D system for our company. It was 3 rationales behind the decision and I made the decision very much by myself. I think we started to build this in 2004." (Stefan Eriksson, Senior Vice President R&D)

Stefan Eriksson is currently the head of the research and development. He had in the previous years been in-charge of all R&D within the F8 group, including EU and Japan. He had experience in establishing and developing the other R&D centres as well. This previous experience added legitimacy to his individualistic decision making. While there was an executive team in the decision committee it was ultimately Stefan Eriksson who rubber stamped it so to speak. The General Manager of the Indian division who was also part of the committee differed somewhat in his assessment of the decision making, which according to him was more collaborative

> "The decision was made by the management which consisted of 5-6 people and if you consider Communications, HR, then add another 4-5 people. The key people were 5-6 who took the decision and small project team was formed who would roll out the vision." (Amit Pal, Chief Engineer and Site Manager, India)

However, Stefan Eriksson is the Head of Global R&D and this offshoring decision would perhaps still have been his responsibility in the end. The

decision makers' views differ slightly perhaps because of the roles and level in the organisation the two are in.

> "There were 3 main reasons why we decided to do it. Of course one was the cost factor; the hourly rate for good engineers in India was and still is very attractive compared to rates in Europe and in US. It's a huge difference. So cost for the resources in India was one of the reasons. The second reason and also an important one was we saw that the market was evolving quite well in Asia and we could also see that developing engines for the mass market in Asia from Europe does not make sense. Then the third rationale that's important was that we have had for many years in different companies in Europe and US been able to attract people with high skills in electronics and software development and now I'm talking automotive electronics and software. So that's what we saw in India that there was a very good possibility to recruit engineers with high skills in mathematics, electronics, and software development, and we needed that." (Stefan Eriksson, Senior Vice President R&D)

In the end, it wasn't that hard a decision to offshore to India because the existing presence of a facility in India and knowledge of the Indian market was a significant decision legitimizer, and this suggests a higher degree of confidence in the resultant decision choices.

> "The advantage was that before we started R&D in 2005 we were present as an R&D group in 1998 with another firm in our group. We pretty much knew the market, the people, and the capabilities of the country." (Amit Pal, Chief Engineer and Site Manager, India)

F8 is into commercial vehicles, which is more volatile than the automobile industry because customers behave according to the financial cycles. Such firms behave like a community; they buy similar things at similar times because they tend to have the same reasoning and same competitive triggers. It is not like car customers who are individual with a lot of personal motivations behind their behaviours. This requires a high degree of flexibility in the R&D functions to a large degree to be able to handle this. In India, F8 is delivering a simpler product in large volumes and they did not have the engineering tradition and the skills to produce this kind of value solutions; the kind of solutions the market is prepared to pay for and what the market

expects. The rationale is to buy engineers who are used to that kind of market and customers. So, seeking cost and resource advantages, and acquiring the market were the key messages in the offshoring motives.

The decision process was based on an emerging country strategy where decisions were made concerning a location strategy, product choice, management structure, and future ambitions from the offshore centre. The decision to locate the R&D centre in India was logically considered based on demographic and geographical factors. Language appears to be an important factor for R&D establishments because the international language for R&D is English whereas production set-ups are local and can be managed in the respective local languages. Cost is still an important movement condition because India is presently cheaper than China, which is now comparable to East European labour prices.

> "China is a good market procurement wise, but when it comes to India there are a number of things: cost, competitiveness and number of qualified engineers and also they can speak the international language of R&D. Also time-zone wise India is geographically in the right place." (Amit Pal, Chief Engineer and Site Manager, India)

F8's R&D in India is low-tech and market specific, and involves a lot of software design activities. However, the primary R&D activity is to design a lower specification, 'value' truck that is sold only in the Indian market. This comes with a different set of customer expectations in which truck that is sold is of a simpler functionality than the European offering. This requirement to make a basic product is quite difficult for engineers and it can lead to a degree of unlearning.

> "On the other hand European engineers have a harder time understanding how Indian customer demands can be quite simple." (Stefan Eriksson, Senior Vice President R&D)

> "We have complete vehicle development and that is similar to what we do on all other sites. Then we also have work package distribution, for example, software development. We are doing a lot of software development in India." (Stefan Eriksson, Senior Vice President R&D)

> "This is a value truck and it is a segment that does not exist today. These are the trucks we design from scratch because the trucks don't exist in the market today." (Amit Pal, Chief Engineer and Site Manager, India)

As mentioned earlier, decision makers in F8 understand the customer and country very well and this is their primary strength. This is a capability of the R&D team in F8 and serves well for them to deliver the right product to the market.

> "We wanted to natural expand and it is always good to be close to the market and design trucks for that market. If one gives the right product with the right specification to the market then you have a very good chance to expand." (Amit Pal, Chief Engineer and Site Manager, India)

The Indian truck market has not matured enough to produce a demand for the European type of products. There is a small market for complex products. However, the mass market in India is still for products that are much simpler than what we see in Europe for example, and the products developed in India are only adapted for the Indian market that has another level of customer expectations. India produces a large number of engineers every year but the skill level of the engineers may not necessarily be appropriate for the specific type of work expected. There is a tussle between engineering capacity and engineering capability and this has posed a challenge to innovation, once the R&D centre has been operational.

> "The system in India is such that the engineers still work on things from the 60s and 70s and never really got the opportunity to design anything new and they are not challenged to design new things and validate it." (Amit Pal, Chief Engineer and Site Manager, India)

> "They get very good marks in exams but when we talk to them we find their capabilities a little lacking and basic engineering skills are lacking. Especially core R&D, then competences and skills are a challenge in India." (Amit Pal, Chief Engineer and Site Manager, India)

Getting the skills to work on the specialized areas of engineering is difficult to find in India, in spite of the volumes of skills available. Also, Indian en-

gineers have not been exposed to the radical, sophisticated engineering designs of European manufacturing. This skills difference, along with the local demands of a lower specification product, leads to innovation outcomes that are essentially still functioning as a cost savings mechanism. There are learning dissimilarities that also exist because of the perceived geographical distance that results in disconnected teams and some efficiency losses. This leads to confidence challenges in the R&D centre abroad and it becomes difficult to transfer high specification work to the new site. The investment in knowledge and training is quite high over substantially longer periods of time. The effect is that R&D in India is to support factory and product issues that are specific to the Indian market. The summary of what the decision makers from firm F8 said along with some key messages that emerged, is provided in table 24.

Table 24: Firm F8 - Keywords and Messages

MAIN KEYWORDS	
Stefan Eriksson	***Amit Pal***
Individual decision	Value solution
Simple products	Understand the country
Learning dissimilarities	Proximity to market and supply
Traditional and opportunity drivers	Introduce right product to market
Prior offshoring experience	Competence, skills, expertise issues
Low tech and support activities	Understanding of quality
	Traditional and proximity drivers

IMPORTANT MESSAGES
Manufacturing firms tend to experience competence, skills, expertise issues
Offshoring R&D assumes low-tech work in India
Unlearning appears to a theme owing to a 'step-down' to a simpler product
There is a difference in the understanding of quality in India
Introducing the right (simpler) product is important in India

Firm F9

F9 is a global industrial group founded more than 140 years ago and presently employs more than 40,000 employees. It is a large manufacturing firm which develops and services industrial tools and equipment. F9 conducts R&D in many different technologies at their worldwide research centres. It is generally decentralised where each division has its own profit and loss responsibility and decision making. F9 established its R&D in India by acquiring another firm and subsequently integrating that into the firm. Trying to get close to or co-locate with their production unit appeared to be important. Placing R&D close to the production unit is an indication of a degree of internal agglomeration which helps firms that co-locate its functions to aim to improve efficiency and to minimize internal overheads.

> "The reason is of course, well the background is that we purchased a company called Ceres[17] 10 years ago or even more and they had a small office in India where they were making engineering and production. That is turned off now and is today our engineering centre." (Erik Lindquist, Vice President, Engineering Services)

> "We have resources in China, resources in Switzerland, and resources in India. All these are connected to the production sites within the divisions. So that's the feasibility where we need to have R&D capabilities close to the production." (Per Wilander, Vice President, R&D)

The primary drivers for establishing an R&D centre in India were the traditional drivers of lower cost production and availability of large numbers of skilled engineers. The availability of large volumes of skilled engineers at relatively low costs is a common thread that resonates across all the decision makers in F9. The unanimity in their thinking is perhaps an indication of a clear strategy and also a strong culture of identity in the company. Some decision makers in F9 also appear to rationalise their decisions by providing examples of other similar firms going to India for the same reasons. The ambitions are to build economies of scale and to develop the In-

[17] Ceres is an alias.

dian centre into a regional emerging country hub for R&D and production. While it is true that India does provide large numbers of engineers, the skill levels of the engineers is an assumption and can perhaps be overestimated as has also been experienced by other similar firms discussed earlier. When firms choose India as a preferred location, it is possibly a result of clustering. Clustering with other firms with similar products, or following the logic of other firms suggests the tendency of legitimising the decision to offshore.

> "Generally as you may have observed most of the R&D centres in emerging countries are started with cost in mind. It is only a beginning. That's how people start, there is good talent there, young talent and then it always helps the global business to be more competitive or be more profitable doing that." (Vikram Mehra, Vice President R&D)

> "The reason is doing more together in a competitive way. We get a lot of scalability by having the centre in India. Definitely this and flexibility are two things driving this initiative." (Arun Dhawan, General Manager)

> "Beginning it was only one. The reason is that there is a lot of engineering, a lot of good knowledge in India at a low cost." (Erik Lindquist, Vice President, Engineering Services)

The R&D is still however relatively basic, low technology, and low intensity. The primary motive of lowering cost perhaps does not permit innovative work being performed. Generating innovation is not cheap and for some firms, research is a luxury because it required having a group of skilled engineers working on non-profitable activities for long periods of time. This is the case for F9 as well. Its R&D is projectised and intended to support their other global R&D sites. This can also be because of the challenges they face in India in terms of gaps in knowledge, confidence issues with the centre itself, and a difference in competence levels when compared with the engineering in Sweden.

> "On a scale of 1-5, where 1 is purely making drawings from designs and to document from 3-D models, very basic and converting drawings from one system to another. Then we have a scale up to 5 where you run projects on prod-

> ucts that are totally developed by the team in India. But the majority of tasks are still from 1 to 2 levels – make drawing conversions, corrections." (Per Wilander, Vice President, R&D)

> "We do very less of core R&D and do more of product development and support, which is driven by R&D teams from different product companies across the world." (Arun Dhawan, General Manager)

F9 is a customer centred firm and their R&D is very client focused where they develop solutions for other firms with am eye on what those firms are willing to pay. The firm understands the market and the customers, and is trying to simplify its product portfolio to deliver them at a lower cost in India.

> "I would say we are close to the customer so we are delivering what the customers want to have. It's a very customer driven R&D. Close to the application, good understanding of how the products are used." (Per Wilander, Vice President, R&D)

> "In India our products are adapted, in the end what the customer wants to see is a value add for what they are ready to pay." (Vikram Mehra, Vice President R&D)

> "But the main knowledge of the Indian market comes from the customer centres. We are close the customer centres in India. They translate the requirements to the local product companies and from the local product companies it comes to us because again we are supporting the local product companies." (Arun Dhawan, General Manager)

Again there is a degree of coherence across firms where some decision makers perceive that it is quite common across firms, to do low intensity R&D or mostly even just development activities in R&D centres. This suggests a degree of rationalisation when it comes to justifying the type of activities being performed.

> "R&D is I think, even if you have production centres is very little of 'R' that is being done. Most of the centres do 'D' or the development part." (Vikram Mehra, Vice President R&D)

India has traditionally been seen as a centre for offshoring which comes across as an important consideration for justifying the reason to go offshore. The rationale could be that if other firms are there then it may make sense for their firm to be there too. It may also be that the existence of ready resources, support infrastructure, and engineering clusters provides a ready pool of skill and other related competencies.

> "We have to see where the engineering talent is there. That is available in Bangalore and Pune so that's why we are here. We have the right talent and right competences." (Arun Dhawan, General Manager)

> "The reason to go to India was that there are a lot of engineering companies that exist in India and the history of having big companies doing major support work for Western companies in Europe. So it's a long tradition where Indian companies have been good in promoting their services to western companies." (Per Wilander, Vice President, R&D)

There were however challenges to overcome even before establishing the centre at a particular location.

> "One is to have the business model and the other is to convince. You need a lot of convincing to see what is the benefit of using this centre and why can't we do it elsewhere." (Vikram Mehra, Vice President R&D)

Getting the buy-in from internal stakeholders was a challenge. F9 needed to start small and make sure that, in the words of Vikram Mehra, Vice President R&D, "we under promise and over deliver". F9 started with simple R&D projects which were essentially just back-end support for other global R&D sites. F9 in India also looks very much like a Swedish firm in terms of a flat hierarchy. This is an effort to reduce the layers between the person running the centre and the engineers. Communication and coordination can be more efficient in R&D management when hierarchies are flattened. In F9, the R&D activities are compartmentalised and projectised according to different customers.

Some of the challenges faced post-entry were related to distance issues and differences in work practices and culture. Distance was a significant

factor for F9 and this appears to be a common element in large manufacturing firms. Not only does it lead to difficulties in coordination and in management, but it also results in partial product visibility where the engineers have never seen the entire product that they are working on because they are always working on a small part of the product.

> "Distance is one of the challenges involved in engineering of this kind" (Arun Dhawan, General Manager)

> "Yes definitely it is a factor like not being able to see the entire product. We need to have a different mind-set of people who are willing to work from a distance, having the ability to visualise things." (Arun Dhawan, General Manager)

Partial product visibility also relates to differences in competency. A skilled engineer or scientist would be more knowledgeable about how various parts are used and where they should go. This appears to be somewhat of a common thought of the decision makers.

> "In most cases they are doing things on small parts of the overall picture. Most of them have not seen the whole product any time which comes back to the competence thing because as a good designer you should know how to use the parts." (Per Wilander, Vice President, R&D)

To risk generalising, Swedish engineers have often, a deep interest in machines and in technical aspects. Also, they choose to be engineers and remain engineers all their lives. In India there are different reasons why one chooses to be an engineer, and many work as engineers for a few years only before moving on to non-technical positions. This causes a lack of depth in competence, which goes back to the fundamental question of whether the skills sought in India are essentially capacity and not capability, as also confirmed in the quote below.

> "People want to move to managerial positions like project leaders and such. So it's very hard to find good engineers who want to stay as engineers. Here in Sweden you can find engineers who want to stay engineers for their life." (Erik Lindquist, Vice President, Engineering Services)

Competency concerns, knowledge dissimilarities, and product visibility appear to be the most crucial issues for firms in the manufacturing sector. The perspectives of the decision makers and what their views may suggest are shown in table 25:

Table 25: Firm F9 - Keywords and Messages

MAIN KEYWORDS	
Per Wilander	***Erik Lundquist***
India's offshoring traditions	Simple design in India
Competence gaps	Traditional drivers of knowledge and skill
Projectised, customer focussed R&D	Projectised, customer focussed R&D
Knowledge dissimilarities	Knowledge dissimilarities
Basic product development	Competence retaining issues
Partial product visibility	Partial product visibility
Vikram Mehra	***Arun Dhawan***
Develop lower cost solutions	Traditional and competitive drivers
Traditional drivers of cost and skill	Presence of R&D clusters
Low-tech R&D	Distance issues
Customer focussed	Prior experience in India
Competence and confidence issues	Skills quality challenge in India
Knowledge dissimilarities	Partial product visibility
Knowledge of the market and customer	Low tech R&D
IMPORTANT MESSAGES	
Seeking engineering capacity and capability	
Clustering appears to be an important theme	
Product visibility and knowledge issues are important challenges for manufacturing firms	
R&D in India is limited and simple, and essentially cost-driven	
The existing presence in India was easier in decision making	
Confidence challenges appear to result from distance, quality and knowledge issues	
Distance seems to be a significant factor	
Low-tech work indicates a possible lack of confidence and the effect of distance	

Firm F10

F10 operates by establishing fully-owned subsidiaries in overseas locations and having the presence of Swedish or 'Western' management in their foreign facilities. Their R&D is quite centralised. Full ownership and centralised R&D is one method for them to secure their intellectual property rights. By not 'spreading' too much, F10 reasons that centrally localising core R&D handles trust issues in an efficient manner. Having a Swedish management presence assumes a higher degree of Swedish contextual knowledge abroad which is seen as a confidence inspiring move.

> "Then the core research is centred in Europe where we keep the research of the material. We keep this in Europe from an IP perspective, from a custom IP perspective." (Caroline Söderberg, Chief Technology Officer)

> "We try to have someone that is Swedish or a Westerner. So we have some expats, not so many, but some in these facilities and that is very helpful for the cultural and management side." (Caroline Söderberg, Chief Technology Officer)

F10 is a relatively small business to business company that sells material to windmill fabricators, marine markets, leisure boats, aerospace interior markets, and various other applications. It had established an R&D facility in India in 2007 and closed it in 2011 by re-shoring the centre back to Sweden. Initially, decision makers at F10 had identified a 'need' for energy in India and had the ambitions to seize the opportunity to become a major supplier.

> "I mean the reason of setting up the factory in India was that there is a large need of energy in India, like all these countries – so the windmill market in India was supposed to be very, very blooming and successful and if you are a windmill manufacturer you also need somebody to supply." (Caroline Söderberg, Chief Technology Officer)

The perception of the market opportunity and the estimated size of the volumes were over-estimated, perhaps driven by an assumed gap in the

market and the absence of a similar product. It could also imply that India wasn't yet ready for the type of technology that F10 offered to provide. F10's entry in attempting to supply high technology solutions was maybe a bit premature at that time.

> "Several countries in Europe are good but there were not so many in India that had any experience whatsoever on this technology." (Caroline Söderberg, Chief Technology Officer)

This is a case of a somewhat over-estimation of Indian engineering skills that were not adequate in understanding and developing technology intensive solutions. As with the other firms discussed in this study, there is a competence gap that has been encountered once firms start their R&D activities in India. The products in India are much more basic and simple than the European solutions, so the capabilities available in India cater to a different type of requirements. This mismatch can prove expensive to bridge as suggested by F10's inability to deliver on its ambitions. India is a pocket of large numbers of engineers but it also means a much bigger difference in quality between skills levels. F10 was unable to develop the market with its innovative solutions.

However, India was simply not ready for such an advanced product and the technology had not yet taken off in India. F10 offerings were not cheap, and the investments required were too intense to allow for economies of scales. In the end, a sophisticated product that the market was not ready for at the time resulted in F10's presence in India not being sustainable.

> "But the technology level of that kind of production in India was not so mature." (Caroline Söderberg, Chief Technology Officer)

> "Maybe it was the wrong time – we were too early." (Caroline Söderberg, Chief Technology Officer)

F10 re-shored in 2011 when the firm could not manage to produce the sales volume they desired. The troubles were related to the market's technology immaturity, skills quality, and institutional inefficiencies in India.

This institutional inefficiency opinion is somewhat contradictory with other firms discussed here. Other firms in this study faced fewer administrative issues in India but had encountered similar technology and quality related challenges that F10 faced.

> "Our production was not sold and it was not so fantastic during this period. Then we suffered a little bit about the structure of India in terms of – now I'm a little bit in deep water – but things took time. There were a lot of administrative complications." (Caroline Söderberg, Chief Technology Officer)

The management at F10 decided to re-shore the R&D back to Sweden as it was proving difficult to operate and grow in India. The central message here is that the perception of the market volume in India and the perception of the technology and skills quality can be misleading when it comes to technology intensive opportunities. The summary of what the decision maker from firm F10 said is provided in table 26.

Table 26: Firm F10 - Keywords and Messages

MAIN KEYWORDS
Caroline Söderberg
Competitive drivers
Perception of opportunity
Capability and market overestimation
Technology and institutional challenges
Innovative product
Difficulty to decentralise

IMPORTANT MESSAGES
There is a high percieved opportunity cost of not being in India. There is present a 'need' for being in India.
The perception of the volume size of the market can be over-estimated.
The skill levels for innovation driven R&D could be over-estimated.
Presence of Swedish management in India assures a higher confidence level.
Confidence challenges appear to result from capability over-estimation.

6. AGGREGATIONS: INTER-FIRM STORIES

> "It is a capital mistake to theorize before one has data." (Sir Arthur Conan Doyle – writer, physician)

Chapter Summary: The aggregated comparison is a cross-case analysis and an agglomeration of the results of the individual interviews and within-case findings. In this thesis a firm is a case and the data presented are further used to develop a cross-case comparison for the offshoring of R&D. The aggregated comparison serves to provide a generalisation of the themes that emerged from the interviews with the Swedish and Indian decision makers in the firms, and seeks to build detailed explanatory components. How offshore R&D is established and what outcomes emerge from it, is explained in detail in this chapter. What influences the decision makers and the influence they have on the offshoring process is also explored.

In the previous chapter of this thesis, I analysed the individual interviews and presented the important keywords and messages. In this chapter, I consolidate the patterns from the tables that were at the end of every firm narrative, into aggregated data as shown in table 27. I build this aggregate table by collecting the data from the individual interviews in the firm narratives; these are used to furnish the information that is presented in table 27. These findings have been consolidated firmwise, are interpreted and segregated into activities, capabilities, encouraging, and discouraging factors. The activities and capabilities mentioned in the table are the viewpoints of the decision makers and are their interpretation of what these mean in their firms. In the table, the encouraging factors are what the decision makers believed were factors that were somewhat positive; these were helpful in justifying their choices to offshore some of the firm's R&D and subse-

quently influenced how the R&D was set-up offshore. The discouraging factors were somewhat negative forces; these potentially affected how innovation was being delivered from the offshore R&D centre.

This table is the base for the inter-firm or cross-case analysis. The activity and capability information from the aggregate table is transformed into higher level themes in an attempt to develop an explanation of how R&D is configured offshore and what value is derived from the R&D arrangement, in terms of innovation. This analysis uses the attributes of the firm to uncover certain generalisations in how R&D is performed offshore. The encouraging and discouraging factors are also transformed into higher level themes in order to explore how the set-up of the R&D and the resultant innovation outcome are affected. These factors work to either legitimise the decision to offshore or hinder the progress of innovation as the case may be. To summarise, the parts of the aggregate table are used to develop aspects vital to the offshoring decision process.

Table 27: Firm-wise aggregated representation of main themes

Firm	Activities	Capabilities	Encouraging factors	Discouraging factors
F1	Reduce hourly cost Bring down the cost Variants of existing products	Quick to market and agility Quick product development Size advantage	Closer to high technology Closer to competence Already had an existing supplier Already had plants in place Form joint venture	Slowing down of processes Differences in quality Competence issues Not enough knowledge Lack of deep knowledge
F2	Developing a new solution Try to transform the market	Specialised product	Previous connections Already had an existing partner A lot of market knowledge It is a huge market	Inefficient operations
F3	Develop to Swedish quality Use to team to deliver quality	Understanding the country Understanding the culture Understanding the customer	Important centre for offshoring Understanding of the country Many firms are already there Two founders have Indian roots	Challenge to deliver quality Difference in depth of skills Difference in quality Product knowledge issues
F4	Reduce the cost of our R&D Explore cheaper designs Introduce the right product	Quick product development Quick to market and agility Understanding the customer	It is a huge market Already had an existing supplier Offshored centres before Already had plants in place	Efficiency reduction Need a basic product Communication distance Difficult to simplify product Not seeing the product fully Lack of deep knowledge Different competence levels Challenge to deliver quality

F5	Use to team to deliver quality Develop the standard product	Specialised product Specialised skills Internal processes	Already present in the market Lot of industry co-ordination It is a huge market Already had plants in place Manager offshoring experience	Management issues Issues in quality Difficult to retain knowledge Competence issues Product knowledge issues Technical gaps in skills
F6	Deliver same R&D at lower cost Develop with acceptable quality	Specialised product Internal processes	Use the logic of other firms Past trends of offshoring Many firms are already there Local team had the knowledge	Attrition of knowledge Management issues Lower competence levels Engineers on short projects
F7	Finding innovations that work Expertise, excellence based work	Specialised product Specialised skills Network and connections	Already had an existing supplier Huge potential user base Manager is from India Introduce the technology	High learning curve Hard to find knowledge
F8	Introduce the right product Develop a value solution Produce competitive quality	Understanding the country Understanding the culture Understanding the customer	Manager worked in India Market evolving well in India Introduce the right product Understanding of the country Firm had offshored before	Need a basic product Poor product visibility Technology level immaturity Management issues Not exposed to latest designs Disconnected teams

F9	Deliver cheaper designs Develop customised products Cost based modelling	Understanding the country Understanding the culture Understanding the customer Quick product development Network and connections	Many firms are already there India's tradition of offshoring Access to competence centres Access to clusters Presence of R&D ecosystem	Not seeing the product fully Lack of deep knowledge Attrition of knowledge Lower competence levels Ineffiecient processes Challenge to deliver quality Develop simpler products
F10	Develop innovative products	Specialised product Specialised skills	Large need in India Big opportunity to be a supplier	Technology level immaturity Disconnected teams Inadequate skills

R&D Offshoring Decision Process

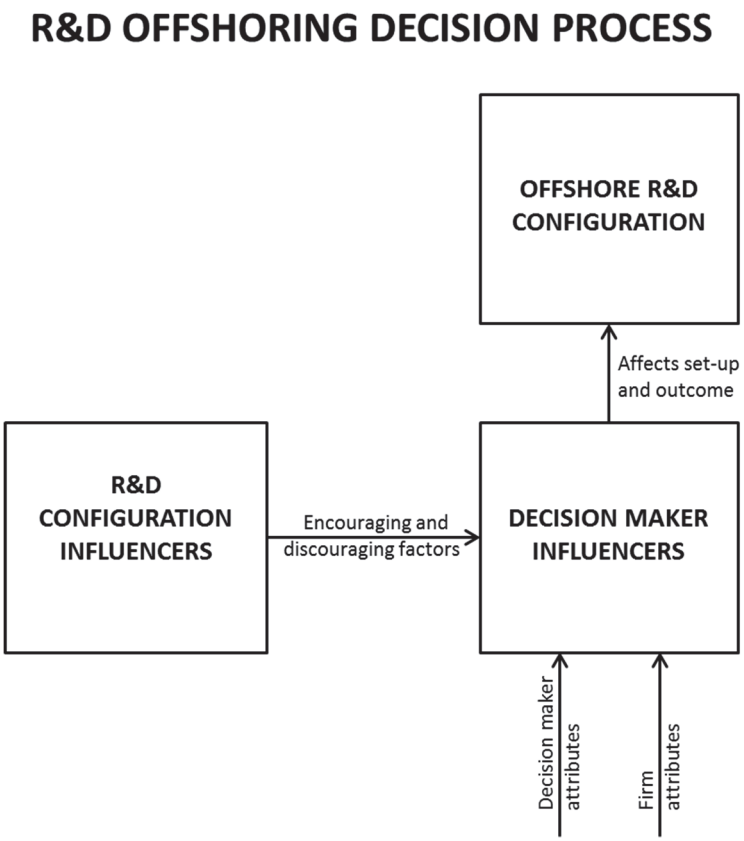
Based on the analysis of the interviews and looking at the information in aggregate form, I suggest a view on the offshoring decision process to describe how decision makers offshore their firms' R&D functions. The aim of this is to explore how the R&D of firms is arranged offshore and what value firms derive from the resultant innovation. I describe the decision process by consolidating three components, each of which is discussed in detail later in this chapter. These components are built by transforming the data from the aggregate level into higher level themes. The interactions between the components are explained by the links between each component and how one component is affected by another. My view of the decision process develops the idea of how the choices made by the decision makers lead to various ways in which the R&D is performed offshore. In order to understand the decision process, I provide a brief overview of each of the process components individually and how they relate to each other.

The most important part of the decision process is the '*Offshore R&D configuration*'. In this part of the process I explain how the offshore R&D is setup according to how the decision makers view the internal characteristics of their firms. I explore this setup along with the resulting innovation outcomes. This part of the process explores the motivation, intent, and outcome of the offshore R&D. The decision process also explores how the R&D configuration might be influenced by the encouraging factors that decision makers consider significant in their justification of the decisions, and the discouraging factors that affect the progress of innovation. This is developed in the '*R&D configuration influencers*' component, which examines the stimuli for the decisions by exploring the factors that tend to affect the choices made by the decision makers. These are positive stimuli that serve to justify the views decision makers have on the phenomenon. Decision makers process this information that may arise from their own experience, the firm's experience, and from the surroundings. Another set of stimuli is a set of factors or challenges that tend to hinder the progress of the offshore R&D facility. These factors can be the result of trends or external forces that may not be in control of the decision maker or the firm. The decision process also explores the motivations of the decision makers for

establishing an R&D facility in India and what constitutes R&D in their respective firms. While the motivations of the decision makers for offshoring R&D are not new, what is interesting is how their viewpoints differ within the same firm and how they relate with the viewpoints of similar decision makers across firms. This is investigated in the '*Decision maker influencers'* component which also uncovers how certain attributes of the firm and the decision makers themselves may have an effect.

An overview of the decision process is presented in figure 3. Each of the boxes shown in the figure is explored at length subsequently in this chapter. Although my view of the decision process is not developed to be a sequential one, the offshore R&D configuration is the end result of the process.

Figure 3: R&D Offshoring Decision Process



Offshore R&D Configuration

The *Offshore R&D Configuration* component answers the first sub-question:

RQ1: How is the offshored R&D configured?

I develop the concept of an R&D configuration which is how R&D is arranged, in this case offshore, in terms of what is being produced and the intention of this production. The activity and capability data from the consolidated view of the firms, as shown in table 28, are transformed into two R&D factors. The activity indicates what the firm does at the R&D centre and reveals the objective of the R&D. This signifies the motivation for the centre in India. The capability indicates how the decision makers view their firms' R&D capabilities and how the R&D is thus positioned or orientated with respect to product centred or market centred. This is the R&D orientation. This reveals where the core focus is of the offshored R&D. The R&D activities are grouped into three overall R&D objectives: cost-savings led R&D, quality-improvements led R&D, and innovation-focus led R&D. The activities that involve reducing hourly cost, finding cheaper design techniques or variations of delivering lower cost R&D are all intentions of producing R&D with a cost-saving objective. Producing a 'value' product or trying to introduce the right product into the market, or motivations to find somewhat better quality solutions or 'competitive' quality are all intentions to deliver R&D with a quality-improvement driven objective. When firms are trying to explore ways to transform a market or are working towards finding new or innovative solutions and products, or working with tasks that require expert levels of excellence then these firms are positioning themselves to deliver innovation-focus led R&D objectives. Why firms exist in a particular R&D configuration offshore is defined by the activities that the firm does offshore and the capabilities it possesses. This transformation of how the various activity types lead to the resultant R&D objectives is shown in table 29.

Table 28: R&D Activity and Capability

Firm	Type	Activities	Capabilities
F1	SM	Reduce hourly cost	Quick to market and agility
		Bring down the cost and to simplify those products	Ability to develop new products quickly
		Variants of already existing products	Size advantage
F2	ST	Developing a new solution	Specialised product
		Try to transform the market	
F3	ST	Develop to the quality the Swedish market demands	Understanding the country or culture
		Use to team to deliver quality	Understanding the customer
F4	LM	Reduce the cost of our R&D	Ability to develop new products quickly
		Explore cheaper designs	Quick to market and agility
		Introduce the right product	Understanding the customer
F5	SM	Use to team to deliver quality	Specialised product
		Develop the standard product	Specialised skills
			Internal processes

F6	LT	Deliver the same type of R&D with a lower cost Developing solution with an acceptable quality	Specialised product Internal processes
F7	ST	Finding innovations that work Expertise and excellence based work	Specialised product Specialised skills Network and connections
F8	LM	Introduce the right product Develop a value solution Produce competitive quality	Understanding the country or culture Understanding the customer
F9	LM	Deliver cheaper designs Develop customer driven products Cost based modelling	Understanding the country or culture Understanding the customer Ability to develop new products quickly Network and connections
F10	SM	Develop innovative products	Specialised product Specialised skills

Table 29: Transformation - Activity to Objective

R&D ACTIVITIES	R&D OBJECTIVE
Reduce hourly cost Bring down the cost and to simplify those products Deliver the same type of R&D with a lower cost Develop a lower solution with an acceptable quality Deliver cheaper designs Cost based modelling	Cost-Savings
Introduce the right product Develop a value solution Produce competitive quality Use to team to deliver quality Develop to the quality the Swedish market demands	Quality-Improvements
Developing a new solution Try to transform the market Develop innovative products Finding innovations that work Expertise and excellence based work	Innovation-Focus

The R&D capabilities are condensed into two overall R&D orientations: customer or market centred and engineer or product centred. These orientations are dictated by the capabilities the decision makers believe their firms possess and these capabilities result in whether firms are focussed on excellence of the products or the engineers or whether firms developed expertise in learning from the customers or from the market. Specialised products or skills, excellence of internal process are indicative of a firm centred on the product or the engineers, while possessing expertise in understanding the market, country, culture or customer, and the ability to produce market specific products quickly, suggests that the capabilities of the firm are orientated towards a clear focus on the market or the customer. This transformation from capability to the R&D orientation is shown in table 30.

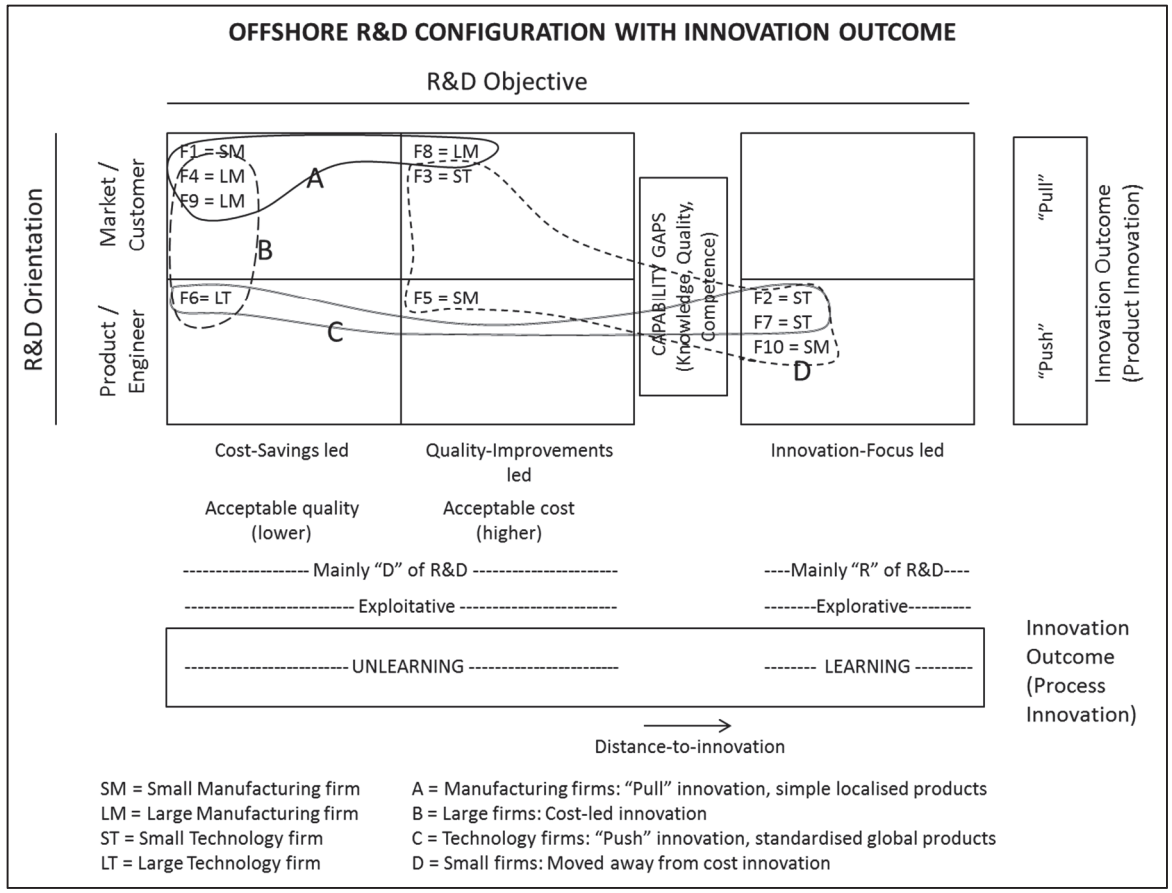
Table 30: Transformation - Capability to Orientation

R&D CAPABILITIES	R&D ORIENTATION
Quick to market and agility Ability to develop new products quickly Understanding the country or culture Understanding the customer	Customer / Market centred
Specialised product Specialised skills Internal processes	Engineer / Product centred

Looking at the firms in aggregation and the transformation to see how R&D happens offshore, I develop an offshore R&D configuration - which is how R&D is structured and performed offshore, as shown in figure 4. I base the configuration on the objective and the orientation of the R&D facility offshore. The objective is one (or some mix) of 3 motives: cost-saving, quality-improvement, and innovation-led. The orientation is the focus of the R&D, which is either product (or engineer) centric or customer (or market) centric. As shown in figure 4, seven of the firms in the study are primarily motivated to save cost or to improve quality from their Indian R&D centre. Slightly older R&D establishments are performing quality improvement or are moving away from cost-saving motives to quality-improvement deliveries. This does not, however, mean that in due course the facilities will work on innovation-focus led R&D activities. For that to happen, other factors need to be considered which include progressing on the challenges discussed later in this thesis. Firms have differing strategic outlook with respect to the focus of their R&D. They may be inward looking or outward looking depending on where their core R&D focus is. Firms that have a standard global product have a tendency to centre their R&D on the product or the engineering expertise. These are inwardly focussed firms or what I call *introverted* firms. Such firms' primary focus lies in transforming its internal engineering strength into a global product that is similar worldwide. Firms that enter a market with a simplified product or a heavily customised offering are more market or customer centred. These are outwardly focussed firms and are what I call *extroverted* firms. Such firms' primary focus lies in transforming market information into customised

products that tend to differ depending on the market. Firms are thus configured to perform R&D in various ways offshore. The R&D configuration of a firm is decided somewhat by the firm size and industry ownership. There are broad patterns that emerge when looked at in aggregation. Manufacturing firms tend to exhibit *'pull'* innovation where firms in the context of this study are working towards producing a simpler, value product specially developed for the Indian market and are not selling their standard European products (or those are not the majority selling ones) in India. According to the decision makers in this thesis, this is because the Indian market is not yet ready for the sophisticated, high quality European product; firms in this sector need to learn to develop simpler, basic products which are the 'right' product for the Indian market. This requirement to produce simpler, lower specification products coupled with the lower quality awareness of Indian customers and engineers alike has been mentioned by decision makers of the manufacturing firms in this study. On the other hand technology firms tend to develop the same product for the global market and there are few or no local simpler versions required. Technology firms are thus exhibiting *'push'* innovation and producing their standard product portfolio everywhere in the world. Push and pull innovation are innovation outcomes of the R&D configuration and these are product innovations. In the studied cases, product innovation results from the R&D orientation where the firm capabilities decide the type of product developed. When firms make simpler products, it is actually a form of unlearning because these firms need to change some of their knowledge and organisational processes in order to try to develop a lower specification product and this is quite difficult to do. This is, however, the *'unlearning'* path to innovation and this outcome is a form of process innovation. Firms performing innovation-focus led activities are on the conventional *'learning'* path which is also an innovation outcome and is a form of process innovation.

Figure 4: Offshore R&D Configuration



Larger firms are still working on cost-savings led R&D where their objective is to bring down costs in developing products, to achieve higher volumes. Smaller firms appear to have moved away from cost savings and are delivering quality-improvements led R&D where they are seeking efficiency gains at an acceptable cost. The small firms in my thesis also appear to be gaining value from innovation-focus led R&D. Smaller firms may have somewhat lower volumes and perhaps do not always compete on scales, so their mode of operation tends towards the designing and development of more innovation offerings at a reasonable but higher cost. Many of the R&D centres in emerging countries are started with cost savings in mind. There is good talent there, young talent and it always helps the global business to be more competitive or to be more profitable doing that. That's one key driver. But then that is only a beginning because although cost may be an advantage that alone cannot offer sustainability because if one cannot maintain quality in research activities then cost savings alone reduce efficiency. After starting with cost savings, firms need to try to make sure that whatever is being done is done at a somewhat improved level of quality so that at the other end of the deliverable there isn't much corrective action required. The third stage is when firms derive value from innovation. These are the different ways in which innovation is configured abroad and it is not necessary for firms to progress from cost-led activities to seeking value in innovation. This is not a sequential configuration; this is how firms are positioned based on current strategy and decision maker led motivations.

The offshore R&D that is configured to produce unlearning, does so with either the cost factor or the quality factor possibly being compromised to an 'acceptable' level. Quality factor here is the level of sophistication in specifications. A lower quality factor indicates a lower specification product. By 'acceptable', I mean a factor the firm is internally willing to partially concede in order to satisfy its primary objective of innovation. In cost-savings led innovation, firms find cheaper designs and solutions to deliver a product at an acceptable (which is somewhat lower) quality. Lower cost is an innovation because the firm devised a different way to reduce their product or service R&D cost. With quality-improvements driven innovation, firms seek efficiency gains in quality at an acceptable (which is somewhat higher) cost than a low cost solution. This is an innovation for the

firm because it is producing somewhat improved designs and functionality. In innovation-focus led R&D firms seek value from innovation-intensive activities but cost and quality are not necessarily compromised. Both process and product innovation are innovation outcomes that emerge from the R&D configuration but with different R&D determinants affecting the outcome.

In terms of the functions performed at the R&D centres offshore, they vary according to what the R&D objectives are. The firms that are deriving value from innovation abroad tend to perform explorative and innovative functions – mostly the 'R' of R&D - and tend to have a greater part retained in Sweden. When centres are primarily established to save cost or to improve quality, the functions performed are supportive and exploitative – mostly the 'D' of R&D – and tend to have a larger presence in India. This is an important theme that emerged from the interviews with the decision makers.

R&D Configuration Influencers

The *R&D Configuration Influencers* component answers the second sub-question:

> *RQ2: How do the decision makers affect the set-up and the outcome of the R&D configuration?*

I explore the logic of the decision making from two perspectives: first, encouraging factors which indicate the various stimuli influencing the decision making, and second, the discouraging factors the decision makers discovered, the magnitudes of which indicate to a degree how logical these decisions were. I interpreted these factors from the answers I got from my interviews. Both these sets of factors affect the R&D configuration in terms of the setup and the outcome. These offshoring influencing factors are presented firmwise in table 31. These are illustrated in the aggregate table at the beginning of this chapter. These factors are the interpreted from the interviews and are represented as a firmwise collection of factors and are revisited in table 31. This list of factors are then condensed by related

themes and transformed to generalisable forms into accelerators and decelerators as shown by the transformation tables presented in table 32 and table 33. The encouraging factors are transformed into *'accelerators'* and the discouraging factors are transformed into *'decelerators'*. These do not represent a firmwise view but rather show a generalised view of the factors that affect the decision making logic in the offshoring of R&D.

When it comes to the encouraging factors, these are transformed into accelerators that assist in legitimising the decision making choices. The degree of Indian context is important and this can arise from the existing presence in India of suppliers, partners, or production units or it can be a result of the presence of extensive local knowledge. The thought of India being a large market, with a potentially large user base, and the opportunity to become an important supplier in India are all transformed into a decelerator for a firm perceived opportunity size. If the firm in question has offshored centres before in India or elsewhere, or if they are already present in the market with a production unit, then the firm's experience of offshoring becomes an accelerator. The presence of many firms in India and using the logic that these firms may have used to set-up their offshore centre is a strong decision justifying factor and hence following the logic of others is an accelerator. Decisions may also be justified based on the accelerator for individual expertise. This stems from decision makers having some kind of Indian context, by being Indian themselves or by virtue of having worked in India or by being previously involved in an Indian offshoring assignment.

Table 31: Decision influencing encouraging and discouraging factors

Firm	Type	Encouraging factors	Discouraging factors
F1	SM	Closer to high technology and to competence	Slowing down of processes
		Already had an existing supplier	Quality level in India
		Already had plants in place	Competence challenges
		Form joint venture	Translate the meaning of the quality
			Not enough knowledge
F2	ST	It was market size and previous connections	Inefficient operations
		Already had an existing partner	
		A lot of market knowledge	
		It is a huge market	
F3	ST	Still important centre for offshoring	Challenge to deliver quality
		Having a complete understanding of the country	Difference in depth of skills
		Lot of small and mid-sized companies are there	Challenges of knowledge
		Two founders have Indian roots	
F4	LM	It is a huge market	Efficiency reduction
		Already had an existing supplier	Need to produce a basic product
		Offshored centres before	Long distance communications
		Already had plants in place	Difficult to simplify product
			Not seeing the product fully
			Lack of deep knowledge
			Different competence levels
			Challenge to deliver quality

F5	SM	Already present in the market	Lot of change management needs
		Lot of co-ordination with the industry	Some issues in quality problems
		It is a huge market	Difficult to retain knowledge
		Already had plants in place	Different competence levels
		Manager had offshoring experience	Product knowledge issues
			Technical gaps in skills
F6	LT	Use the logic others have chosen	Attrition of knowledge
		Decision was linked to past trends of offshoring	Management and leadership issues
		Many firms are already there	Competence levels are not high
		Local team had the knowledge	Engineers work on short projects
F7	ST	Already had an existing supplier	High learning curve
		Huge potential user base	Hard to find people with ready knowledge
		Manager is from India	
		Technology can make a difference in the market	
F8	LM	Manager worked in India before	Need to produce a basic product
		Market evolving well in India	Poor product visibility
		The right product can make a difference	Technology level immaturity
		Knew the market, people and country	Lot of delegation and co-ordination needs
		Firm had offshored before	Not exposed to latest designs
			Teams can be quite disconnected
F9	LM	Many firms are already there	See only the small parts not the full picture
		India has a tradition of offshoring	Attrition of knowledge
		Access to competence centres and clusters	Competence levels are not high
		Presence of R&D ecosystem	Need to build better processes
			Challenge to deliver quality

			Develop simpler products
			Differences in product and application knowledge
F10	SM	Large need in India	Technology level immaturity
		Big opportunity to be a supplier	Need people at the same place
			Inadequate skills

When decision makers talk about how their firm's technology or product can make a difference to the market, or if there is a shortage of some resource in India that they can supply, then this need to develop the market becomes an important decision making accelerator. India is perceived to still be an attractive centre for offshoring even it is not necessarily for R&D offshoring. When decision makers discuss India's tradition for offshoring and how their decisions are also linked to India's past trends of offshoring then this becomes a decision accelerator. Finally, the presence of R&D clusters is an important accelerator. When decision makers talk about being close to locations providing high technology and competence, gaining access to such R&D ecosystems and competence clusters, or being inside networks and benefitting from the co-ordination in the industry, then this accelerator is an important decision legitimiser. The transformation from encouraging factors to accelerators is shown in table 32 and the accelerators are explained in detail in the section titled *'Accelerators'*, later in this chapter.

Table 32: Transformation – Encouraging factors to Accelerators

Encouraging factors	Accelerator
Already had an existing supplier Already had plants in place Already had an existing partner A lot of market knowledge Having a complete understanding of the country Local team had the knowledge	Degree of Indian context
It was market size and previous connections It is a huge market Huge potential user base Market evolving well in India Big opportunity to be a supplier	Firm perceived opportunity size
Already had plants in place Offshored centres before Already present in the market	Firm's prior experience in offshoring
Lot of small and mid-sized companies are there Can use the logic others have chosen Many firms are already there	Follow the logic of others
Founders have Indian roots Manager had offshoring experience Manager worked in India before Manager is from India Know the market, people and country	Individual expertise
Technology can make a difference in the market The right product can make a difference Large need in India	Need to develop the market or technology
Still important centre for offshoring Decision linked to past trends of offshoring India has a tradition of offshoring	Past trends of offshoring reasons
Closer to high technology and to competence Lot of co-ordination with the industry Lot of engineering firms exist in India Access to competence centres and clusters Presence of R&D ecosystem	Presence of R&D cluster

The challenges faced in India when it comes to delivering high quality, or a different benchmark between Sweden and India for what constitutes good quality, or how teams view the same quality specifications, are all manifestations of a difference in the understanding of quality. This is the common decelerator across firms when quality related issues are concerned. Competence related challenges are transformed into a decelerator for gaps in off-

shore competence. This may comprise a lack of depth of skills, generally lower competence levels among Indian staff, not being exposed to the latest European designs, the Indian staff requiring a high learning curve, or the requirement to bridge skill gaps with a lot of technical trainings. Product related inhibitors in terms of not being able to see the whole product at any time in the development work or working on small parts of the product are a failure to see the full picture and this inability to see the entire product is a decelerator. Management and leadership issues, organisational process problems, efficiency issues, and the requirement of a lot of change management in the offshore centres lead to inefficiencies in operations which in turn is the decelerator that is hindering the progress of conventional innovation. Knowledge attrition is a decelerator that arises from the difficulty to retain skilled talent in India and a general high attrition rate in India. At a firm level this is a decelerator for the lack of depth of knowledge. This is a result of individuals not possessing the required product, design or tools knowledge, or knowledge leaving the firm when an individual leaves the firm, or a lack of deep knowledge because engineers work on short term projects and never acquire in-depth knowledge in the area of their work. The need to have people at the same place, and issues with long distance communications highlights the significance of distance which is another hindrance to the progress of the offshore centre. Lastly, a very important decelerator is unlearning, which is what could be required to produce a simpler product or to learn to knock down functionality and additional features in design and development. The transformation from discouraging factors to decelerators is shown in table 33 and the decelerators are explained in detail in the section titled *'Decelerators'*, later in this chapter.

Table 33: Transformation – Discouraging factors to Decelerators

Discouraging factors	Decelerator
Quality level in India Translate the meaning of the quality Challenge to deliver quality How teams view the same thing Issues in quality	Differences in the understanding of quality
Difference in depth of skills Different competence levels Technical gaps in skills Competence levels are not high High learning curve Not exposed to latest designs Inadequate skills	Gaps in offshore competence
Technology level immaturity	Immature market or technology
Not seeing the product fully Poor product visibility See only the small parts not the full picture	Inability to see the entire product
Slowing down of processes Inefficient operations Efficiency reduction Little more bureaucratic in India Lot of change management needs Management and leadership issues Need to build better processes	Inefficiencies in operations
Difficult to retain knowledge Heavy attrition of knowledge	Knowledge attrition
No experience being handed over Challenges of contextual knowledge Lack of deep knowledge Product knowledge issues Engineers work on short projects Hard to find people with ready knowledge Differences in product and application knowledge	Lack of depth of knowledge
Long distance communications Teams can be quite disconnected Need people at the same place	Significance of distance
Need to produce a basic product Hard to knock down functionality Develop simpler products	Unlearning

The 'accelerators' are the decision legitimisers that decision makers use to justify their offshoring choices while the 'decelerators' are the factors that serve to influence the progress of innovation offshore. These are decision logic factors and together these may help explain the logic of the decision

makers. Exploring these accelerators and decelerators takes into account the individual, the firm, and the environmental (external to the firm). All these influence the factors being considered. In the individual context, the factor exists because of the presence (or absence) of, or the personal experience of a particular individual or group of individuals in the decision making process.

The firm context indicates that the factor is a characteristic of and endemic to the firm. The firm level determinants could be tacit knowledge existing in the firm, resources, or certain capabilities that exist in (or are missing from) the firm. The environmental context signifies factors that are industry wide or otherwise external to the firm. This could be a result of institutional influences, economic factors, technology factors, competition, and market forces. Decision makers use information arising from all these contexts to justify their decisions. They take information from their personal experience, the firm's collective knowledge, and from external sources, and use those to justify their choices. Discouraging factors also emerge from these three contexts and act as somewhat negative forces to innovation progression. The configuration influencers are detailed in figure 5, segregated by the accelerator or decelerator, and by the individual, firm, and environment level contexts.

Figure 5: R&D Configuration Influencers

R&D CONFIGURATION INFLUENCERS

Accelerators	Decelerators
Individual level	Individual level
Degree of Indian context	Gaps in competence
Individual expertise	Difference in understanding of quality
	Lack of depth of knowledge
Firm level	Firm level
Firm's experience of offshoring	Unlearning
Follow the logic of others	Inability to see the entire product
Firm perceived opportunity size	Significance of distance
	Inefficiency of operations
Environment level	Environment level
Presence of R&D clusters	Knowledge attrition
Need to develop the market or technology	Immature market or technology
Past trends of offshoring reasons	

Accelerators

The *'accelerators'* that emerged from the interviews are explained here.

Degree of Indian context

Decision making acquires a higher level of confidence when there is a higher degree of Indian context within the firm. This is the availability of India-specific experience of decision makers in the firm either due to the presence of decision makers with an Indian background or from Swedish decision makers who have worked in India before. This first-hand experience of India often brings with it assumed knowledge of the Indian market, country culture, work practices, management structures, and understanding of institutions. This knowledge leads to an assumption of a better understanding of the Indian market and business environment and hence is a strong decision justifier. Considering firms F3 and F5 as an example, there were decision makers who had an Indian connection either by virtue of be-

ing of Indian origin or by having worked in India. This presence of an Indian context appeared to make the decision to offshore to India easier.

Individual expertise

This is a positive stimulus when it comes to justifying the decisions in the studied firms. When there are decision makers in a firm who have been involved in such offshoring decisions before or who have established R&D centres before, that experience tends to provide a somewhat higher degree of confidence when faced with a similar decision making situation. In firm F8 for example, the vice president of R&D had established other R&D centres for the firm and was confident about the decisions for the Indian centre as well. His expertise in this matter tended to add legitimacy to the somewhat individualistic decision making.

Prior experience in offshoring

This factor can be viewed from two angles. Firstly, firms that already had a production centre in India considered this as an advantage because a lot of the groundwork in opening a facility in India had already been done. Secondly, firms that had an offshore centre in Asia or in another developing country assumed many of the challenges to open a centre in India would be similar. This theme was discussed in firms F4, F5, and F8, which are all manufacturing firms. The decision makers here were somewhat more confident of using this previous experience of the firm as a positive influencer in the decision making and this led to the establishing of an offshore R&D centre in similar arrangements to the previous arrangements in their prior offshoring endeavours.

Follow the logic of others

From the discussions with decision makers phrases such ‘obvious reasons’, ‘we all know that’, and ‘everyone goes there’ emerged as quite commonly used terms and these suggest a somewhat taken for granted attitude. Mostly for firms F2, F6, and F7, was this logic considered important. These are

technology firms and to an extent this thinking seems intuitive because India has been a centre of technology outsourcing. If other firms similar in size and product offerings exist there and are performing well, then there is no reason that their firm cannot as well. The logic used for going offshore is also similar even if internally each firm may be organised quite differently with different strategic goals offshore. The presence of other firms already performing R&D in India is enough motivation for decision makers to justify their own decisions. Their R&D arrangements of these firms are similar to each other with similar activities being performed in each of these case firms.

Perceived opportunity size

This is a common theme that was discussed in all the firms except for F1 and F9 which didn't consider it as important. India is a large market providing sizeable opportunity in both the manufacturing and technology sectors for an international firm. Decision makers who look to have a research centre in India see this potential market opportunity as a window for generating volumes sales for any new or modified products that they may develop. This opportunity may not always be a correct fit for the firm's portfolio and potential offerings but this perceived market size is a strong reason for decision makers deciding to open an R&D facility in India. This is also the fear of missing out the opportunity and losing ground to competitors. The 'need' to be in India is an important justifier that is related to the opportunity size.

Presence of R&D clusters

Some regions in India, for example, Chennai in south India and New Delhi in north India are industry corridors[18] where firms from the same industry form clusters to seek the same benefits of resources, infrastructure, taxation cuts (if applicable), and networks. Decision makers from firms F1, F5, and

[18] This is according to the Institute of Developing Economies (IDE) which aims to be a leading centre of social science research on developing regions. This particular report can be accessed via the link: http://www.ide.go.jp/English/Publish/Download/Dp/pdf/103.pdf

F9 discuss this as an important factor for the decision choice. A cluster of R&D facilities in a particular region indicates a development of resources and infrastructure for that industry and accessing these would be beneficial for their own potential centre as well. Lesser investments would be required in trying to develop their own R&D centre because many of the pre-requisites are already present in that region. These 3 firms are manufacturing firms and for manufacturing firms it is more important to have infrastructure and resources already available in the vicinity because the investments tend to be larger in such firms as compared to technology firms which produce services or intangible products. Thus cost-savings led and quality-improvementsled R&D initiatives would tend to take precedence over the perhaps more expensive innovation-focus led activities.

Need to develop the market or technology

Firms F2, F7, and F10 have an innovative product or solution that does not exist in the Indian market. The need to introduce a new technology into India or to access a nascent market not previously penetrated by a similar product is an attractive force for the decision makers to consider during their decision making process. This determinant is related to a perceived market opportunity and the decision makers see it a first mover advantage by being the first firm to introduce a product to fulfil a market need. This could also be an inhibitor as explained later in this section, when a market not being technologically ready can actually prove to be a hindrance. As a consequence all 3 firms are performing innovation-led R&D activities and their offshore R&D centre configuration reflects this need to improve the market or technology offering. Also, these 3 firms are all small firms, it possibly makes it a little easier to effect a change in the market or technology as smaller firms can tend to be more nimble in the approach to change.

Past trends of offshoring reasons

According to A T Kearney's 2016 Global Services Location Index (GSLI)[19], out of the total 55 countries analysed India was rated the world's largest destination for offshoring functions, especially in technology and services. However, there have been several spikes and troughs in the offshore market ever since India became an attractive destination. It is not yet known how long this life cycle will last and it is also not known whether a firm offshoring to India now will receive the same value benefits as a firm that offshored a decade ago did. The offshoring trend was still a strong incentive for the decision makers from firms F3, F6, and F9. These firms are all set-up in the unlearning phase of process innovation because this is what the trends suggested as the best arrangements for firms such as these.

Decelerators

The *'decelerators'* that emerged from the interviews are explained here.

Gaps in offshore competence

India provides many engineers and scientists in large numbers because of its many engineering and science schools. However, there are a few problems concerning the quality of the skills. Decision makers from all the 10 firms in this study have mentioned there being a difference between a good engineer and an average engineer in India while that difference is quite small in Sweden although for firms F2, F7, and F10 this wasn't as significantly affecting them as it was for the rest of the firms. Many engineers in India have never worked on the more sophisticated technologies that are common in Europe. Availability of skills does not always translate into quality of skill and it also does not mean current or relevant skill. The decision makers may need to perform better due diligence of skills requirements and capabilities to minimise the impact of the possible lower

[19] GSLI is a research paper that analyses and ranks the top 55 countries for outsourcing worldwide based on metrics in three categories: financial attractiveness, people skills and availability, and business environment. It can be accessed via: https://www.atkearney.com/strategic-it/global-services-location-index

competence levels. Many of these firms are not deriving full value from conventional innovation in their R&D centres because they are still on the unlearning path in their R&D configurations.

Differences in the understanding of quality

Several decision makers in this study, notably from firms F1, F3, F4, F5, and F9 have discussed the culture of quality of Swedish customers and the way Swedish firms and customers view quality. These are all manufacturing firms and the concept of quality tends to be different for Indian engineers and for Indian customers. This difference in the understanding of quality manifests in the way Swedish and Indian engineers in the same firm view the same task. Often for an Indian engineer a task is complete if all requirements are met but for a Swedish engineer aesthetics and elegance are also as important as the technical specifications. This can slow down the innovation process because of the differences in the benchmark of what constitutes a quality product. Technology firms do not suffer from this issue because the technology offering is the same globally and the Indian engineers are quite up to date with latest technologies and knowledge.

Lack of depth of knowledge

European engineers tend to be more 'loyal' and stay in a firm longer than Indian engineers do in India. Also, they work in engineering positions for longer periods of time than Indian engineers who tend to seek managerial positions after working for a certain period of time in the firm. Decision makers from all 10 firms discussed the lack of knowledge as a factor that needed a high degree of attention in order to progress with the R&D activities. The combined effect of engineers and scientists leaving for another firm or their promotion to non-engineering positions leads to a poor flow of knowledge in the Indian engineering function. It becomes more difficult to find engineering resources possessing deep functional knowledge of complex machinery and tools. This is a potential hindrance to delivering value in innovation and is an important discussion for decision makers to have.

Simple products and unlearning

From discussions with some decision makers, I learnt that Indian products can tend to have simpler specifications than the European counterpart. Most noticeably for firms F4, F5, and F8, which are large manufacturing firms, they are not used to producing simpler products as their core philosophy is to provide sophisticated products to the market, but the cost of those sophisticated products is not acceptable in India. This results in firms searching for a similar but lower specification product that the customers are willing to pay for. As discovered in this thesis, this needs some 'unlearning' by the engineers and that is much harder to do than 'learning'. Engineers and scientists are trained to strive for developing better designs, better products, and ever more sophisticated functionality, so going in a somewhat opposite direction proves to be quite difficult for them to do. Simpler products in terms of specifications, sophistication, or developing a basic version of a product can hamper the creation of value that is achieved by product innovation.

Inability to see the entire product

Working on a part of the research and not being able to fully visualise the entire product is also a factor that affects manufacturing firms more than it does technology firms and is mostly a bigger issue for the larger firms. As evidence firms F4, F6, F8 and F9 discuss this as a problem. These are all large firms and such firms tend to be a little more geographically dispersed and with more functions involved in the development of the product. The R&D in India is configured in a way that engineers rarely work on the whole product or process but only on specialised parts and thus don't get to see the final product. In Sweden it is somewhat different as the engineers can easily view the entire product because they are often co-located. This leads to possible asymmetries in knowledge offshore for and a poorer understanding of the product.

The significance of distance

Distance appears to be a significant discussion in some firms, and particularly in manufacturing firms. Firms F4, F5, F8, F9 and F10 are all in the manufacturing sector and decision makers from these firms refer to distance as a crucial inhibitor when it comes to getting work optimised. Distance here refers to both geographic distance and time-zone differences but not so much to national cultural differences. Decision makers speak of 'sheer distance', 'pure distance' and similar phrases and associate that with coordination overheads, communication overheads, and issues with knowledge flows. Not being able to resolve any design and development issues and conflicts in an optimal way time-wise can be a potential hindrance.

Inefficiencies in operations

Operational inefficiency was a common theme discussed mostly by decision makers from firms F1, F4 and F9, and was mentioned also as a minor consideration by decision makers from F5 and F8. All these firms are manufacturing firms and except for F5, the other four are customer facing, extrovert firms. The discussions suggested a degree of disconnect between the market and the firm in terms of translating the inputs received into a viable product. These firms experienced some increase in the frequencies of management intervention, greater headquarter control, and lesser subsidiary autonomy. Additional layers of inefficient institutions and ecosystem intricacies work to compound the overall inefficiency of the offshore function. These combine to cause potential confidence challenges which lead to less critical and more routine and easily replicable work being offloaded. This is somewhat detrimental to the progression of innovation value delivery.

Knowledge attrition

This is an environment level factor that is a challenge faced by many firms in the thesis. Knowledge attrition indicates a fast-moving labour market especially for the kind of technology-intensive skills that are required for

the R&D work in India. Engineers do not often stay in the same roles for long enough; they move either to another firm or to higher level role in the same firm where their job is not essentially an engineering function. This factor is also somewhat related to the fact that there is a presence of R&D clusters in India, which provides other opportunities available for a skilled engineer. As an example, decision makers from firm F5, F6, and F9 mention knowledge retention as quite a challenge, and this is an important factor that somewhat hinders delivering value in innovation from the R&D centre offshore.

Immature market or technology

The decision makers of firms F2, F7, F8 and F10 talked about developing the market or technology as a key motivator in performing research activities in India. While this is an opportunity to deliver a relevant product to the market it can also prove to be a great challenge to overcome as was discovered by one firm, F10, which had to finally re-shore because their portfolio was too sophisticated for the Indian market. Sometimes the market is not ready at that time for a particular kind of product. Decision makers need to assess the technology readiness of a potential market while making decisions on what kind of R&D activities they plan to deliver offshore.

The accelerators and decelerators have been established by using the data from the interviews and arise from their views of how they motivated their choices and what difficulties affected the outcome of the choices. Some of these factors are also common knowledge especially factors concerning India's past trends as an offshoring destination, the presence of R&D clusters in some parts of India, and the significance of distance. These were confirmed and are still relevant and strong forces that affect offshore decisions and outcomes.

Decision Maker Influencers

The *Decision Maker Influencers* component answers the third sub-question:

> *RQ3: How do the attributes of the firm and the decision maker influence within-firm and inter-firm differences?*

This question is answered in two parts. The first part is an explanation about how decision makers view this phenomenon and the themes that they discussed often during the interviews. These themes, as I will present, were generally the areas of concern for the decision makers where more thought was needed or more time was taken during the decision making process. These opinions varied within a firm as well, depending on whether a decision maker was Swedish or Indian and whether the decision maker belonged to the management function or to the technology function within the firm, as explained later in this discussion. Table 34 is the presentation of the generalised viewpoints of the decision makers and is segregated by their role in the firm and their nationality. These views can tend to diverge within the a specific firm because a decision maker can sometimes make a different interpretation of the same situation depending on their role in the organisation and their nationality, but it can also tend to represent a convergence of views of decision makers across firms, especially those who belong to similar roles across the firms. Thus the same view of offshoring and decision characteristics could lead to a somewhat different interpretation within the firm and across firms. When decision makers are grouped by function and nationality, their opinions suggest a possible bias arising from their identity in these two groups, and these can be different from the views held by those whose identities are in a different group.

From the data I suggest that Indian decision makers tend to be more optimistic when it comes to offshoring decisions. This is possibly a result of their first-hand knowledge of the Indian market, industry, and environment. As seen in the table, Swedish decision makers tend to place a high value on maintaining tight management control at the offshore R&D centre. Even in this case, it tends to be only the Swedish decision makers from

the management function who have this concern. Management employees would perhaps need to have stronger processes in place to justify an offshoring decision while technology employees may not be as concerned about the type of governance structure offshore. The Swedish decision makers from both functions discuss the importance of the presence of an Indian context or previous offshoring experience, in being optimistic towards the decision. This suggests the requirement of comfort factors that help in building the confidence of the Swedish decision makers. This is absent from Indian decision makers' thinking because they possibly already have the implicit confidence of the knowledge of the local turf. Technology decision makers from both Sweden and India view core activities as critical and recommend retaining those in Sweden. The management employees do not share this view and it is possible that their detailed understanding of the R&D function is quite different from what it means to the decision makers who belong to the technology function. Core R&D activities are directly under the domain of the technology function, so the decision makers belonging to this function in both India and Sweden are more motivated to try and ensure that the R&D function remains manageable. Resource confidence is another area in which the viewpoints of the decision makers differ. Swedish technology decision makers raise concerns about the lack of quality emerging from the Indian centre, while this is not as much of a concern shown by the Indian group of decision makers. This suggests a difference in understanding of what constitutes quality. It is possible that the Indian decision makers have a lower threshold than Swedish decision makers have, for what is good quality, and this is reflected in their views within the firm and it is a common thread across firms for Swedish technology decision makers. Swedish decision makers who are in the management function are not as concerned with the 'definition' of quality, suggesting that they tend to be somewhat removed from the R&D activities that emerge from the Indian centre. Swedish decision makers in both functions express concerns about the depth of knowledge possessed by the Indian staff and have a lower confidence level in the offshoring phenomenon than Indian decision makers have. This results in a somewhat lesser confidence in the resource capabilities in India. This results from a difference seen in the quality as discussed earlier and a lack of knowledge or possible visibility

of the Indian facility and staff. Resource competence is surprisingly a concern raised mostly by the technical decision makers in India. This could possibly be a result of new processes, technologies, and ineffective training and learning transferred to the Indian resources. Within firms this resource confidence is a divergent view but finds similarities across firms in similar groups of decision makers. Table 34 explains how the opinions of the decision makers diverge within a firm depending on whether they are in the technology or in the management role, and whether they are Indian or Swedish. This tends to suggest that perhaps the motivations are different for decision makers in different functions and they attach different importance to the same things. For example, a person in a management role may view the importance of tighter governance and control differently than one in a technology role would. The management function may also be driven more by market forces and profitability while the technology function may be more interested in product excellence and specifications. A similar dichotomy can arise for nationality differences. An Indian decision maker can tend to assume a greater knowledge of the Indian environment and thus exhibit a higher degree of confidence in the Indian operations and may view the degree of challenges as more manageable than a Swedish decision maker might. While these views can diverge within the firm they can converge across firms with decision makers in similar identity groups. This is an interesting result of this study and shows that often decision makers can tend to hold different views within their firms but can have similar thoughts across firms.

Table 34: Convergence and Divergence of Decision Makers views

DIVERGENCE (AND CONVERGENCE) OF DECISION MAKERS BY ROLE AND BY NATIONALITY

DECISION OPTIMISM	RESOURCE CONFIDENCE	DECISION PROCESS	DECISION CHALLENGES
Management Control (M, S)	Lack of Quality (T, S)	Fuzzy Definition (M, SI)	Operational Inefficiencies (MT, S)
Prior Offshoring Experience (MT, S)	Depth of Knowledge (MT, S)	Usage of Tools (MT, S)	External Environment (T, S)
Indian Context (MT, S)	Competence (T, I)	Mode of Entry (MT, S)	Distance (M, I)
Retain Core Activities (T, SI)	Confidence (MT, S)	Project Selection (MT, S)	Culture and Language (M, S)
Decision Ease (T, S)			

Decision Maker role and nationality
M: Management function
T: Technology function
S: Swedish
I: Indian

Example
MT, S: Swedish Decision Makers from both Management and Technology functions
T, I: Indian Decision Makers from the Technology function

The definition of R&D varied among the decision makers. Decision makers in the technology functions in both India and Sweden were clear about what R&D meant in their firms while the definition was not quite clear for the decision makers who belonged to management functions. This indicates some distance that exists between the management function and the definitive knowledge of the R&D function, which is clear for the technology decision makers. Swedish decision makers tend to be slower and more

cautious when assessing the mode of entry for establishing an R&D facility in India and for selecting an appropriate initial R&D project, as also evidenced by a greater usage of analysis and tools in decision making. The Indian decision makers are more enthusiastic when talking about both the mode of entry and the entry project. This suggests a possible lower overall confidence level initially in an Indian centre, as discussed earlier. This is a degree of uncertainty about what to expect in India while for Indian decision makers this effect is largely mitigated because they would have an implicit knowledge about the business environment and work practices in India. Indian decision makers exhibit a higher degree of optimism than their Swedish counterparts so they tend to spend lesser time in choosing entry criteria for the R&D setup in India. Thus a Swedish decision maker in a firm will tend to differ from an Indian decision maker in entry criteria and project selection discussions but Swedish decision makers across firms would tend to think alike by exhibiting a greater degree of caution.

Culture and language dissimilarities are important criteria in the perspectives of those Swedish decision makers who are in management roles. Technology decision makers in Sweden and Indian decision makers in general are not necessarily as pessimistic about these because of two possible reasons. Firstly, technology decision makers tend to speak the same language – technical specifications and engineering terminology are understood the same way worldwide by technology practitioners – so that has more in common than with management employees between countries. Secondly, Indian decision makers do not consider cultural differences so important in R&D delivery. Having explored this, it is interesting to observe that geographical distance in fact is more an issue in Indian decision makers' views than it is for Swedish decision makers. Indian decision makers consider proximity with Swedish engineers as beneficial from a knowledge and process training perspective where they believe that a greater geographic distance slows down the transfer processes between Swedish and Indian engineers. Indian decision makers believe a 'warm body office'[20] is beneficial for greater knowledge transfer. Operational inefficiencies in work practices are important considerations for Swedish decision makers

[20] Warm body office is when team members of a project work in close proximity in the same office.

across both roles. This is possibly also similar to lower confidence levels Swedish decision makers have on the ability of the Indian centre to deliver quality R&D, as the discussed earlier in this section. Indian decision makers do not share this view.

The second part is why the decision makers offshored what they perceive to be R&D functions. 8 of the firms discussed have an R&D unit, lab, or centre in India and are performing some form of research and development activities in their Indian facility. Of the other 2, F7 performs only ad-hoc R&D in India, while F10 re-shored its R&D back to Sweden. However, what constitutes R&D varies depending on how decision makers within the firm view this function. In table 35, the numbers indicate the number of times the respective elements were discussed in each perspective of what R&D is. These are decision makers' views of R&D in their firms and are not necessarily an academic or industry definition of what R&D means. On looking at the table, R&D as low-risk, low-tech work emerges as the most important discussion for the decision makers. As I will present later in this section, India is still relevant as a lower cost location and because innovation led R&D activities are expensive, R&D functions performed from India still tend to be of a somewhat lower specification. This is especially true for manufacturing firms, as can be seen from the table. This could also be because decision makers from manufacturing firms talk about R&D as a product simplification exercise. These together lead to the development of simpler products and the offshore work is possibly of lower technology or functionality levels. Manufacturing firms also have a case for local adaptations which means they adjust their products to fit the specific needs of the market.

Table 35: What do decision makers mean by R&D?[21]

FIRM	TYPE	Standard product	Product simplification	Low-risk, low-tech work	Support functions	Product development
F1	SM	0	1	4	2	2
F2	ST	2	0	0	0	1
F3	ST	0	0	0	0	3
F4	LM	1	2	7	2	2
F5	SM	1	0	8	1	5
F6	LT	0	0	3	0	4
F7	ST	2	0	0	3	0
F8	LM	0	4	1	3	2
F9	LM	0	0	8	8	3
F10	SM	0	0	0	1	2
		6	7	31	20	24

This is manifested in their view of what R&D is in their firm and is shown in table 35. For firms F2, F3, F7, and F10, the low-tech and product simplification activities of R&D are not discussed at all. These 4 firms are all small firms and are essentially performing activities for regular product development or support functions for global R&D centres. F2, F3, and F7 are technology firms, in which product simplification activities are generally not very significant because they tend to have a standard, global product which is essentially the same worldwide.

Why the decision makers decided to offshore the above discussed R&D functions is explained in the paragraphs that follow. This again shows the views of the decision makers and the summary of this discussion is presented in table 36.

[21] Type: 'S' means Small firm, 'L' means Large firm, 'M' means it is in the Manufacturing sector, 'T' means it is in the Technology sector. So, Type 'ST' indicates a **Small** firm in the **Technology** sector.

Table 36: Decision makers' motivations to offshore R&D

		TRADITIONAL			PROXIMITY		STRATEGIC		COMPETITIVE	
FIRM	TYPE	Low cost	Resource availability	Location advantage	Close to market	Close to production	Modernise industry	Emerging market	Market size	Opportunity cost
F1	SM	4	2	0	3	0	0	0	1	3
F2	ST	0	0	0	0	0	1	0	2	1
F3	ST	1	2	2	0	0	0	0	0	0
F4	LM	5	3	1	6	0	0	3	4	3
F5	SM	5	5	2	2	2	0	4	1	1
F6	LT	4	5	2	1	0	0	0	0	1
F7	ST	0	0	2	0	0	0	0	2	1
F8	LM	2	2	2	3	0	0	3	1	2
F9	LM	6	7	4	1	3	0	0	0	0
F10	SM	0	0	0	1	1	0	0	2	2
		27	**26**	**15**	**17**	**6**	**1**	**10**	**13**	**14**

From the table it is clear that the traditional reasons for offshoring – low cost and skills – are still the most discussed, and more so for manufacturing firms. Although the labour costs in India have increased tremendously over the last few decades it still is attractive enough as a primary driver for finding large numbers of skilled resources at competitive prices. This is especially relevant in R&D because R&D engineering and scientists skills are even more expensive elsewhere than they are in India. Lowering the cost of R&D and its appropriation is important for the firms that chose to open an R&D centre in India. It is interesting to note, however, that for three firms – F2, F7, and F10 – low cost and skills volume were not discussed at all as R&D offshoring drivers. As we saw earlier in this study, these are firms most closely configured to perform innovation led R&D. These firms essentially sought competitive drivers of market size and opportunity cost as major motivations for R&D in India. These three are also all small firms and from the offshore R&D configuration model I presented earlier we can see that smaller firms have moved towards innovation led configurations and away from cost and quality centred dynamics.

Decision makers in production firms deem it important to locate their R&D close to the market and to the production, while these are not so im-

portant for decision makers from technology firms. This difference could be because decision makers from production firms use the information they receive from the market to work on relevant products so proximity to the market is more significant for them. For technology firms, market information other than market size is not so important. The 'need' to be in an emerging market and the 'fear' of missing the opportunity are discussions that resonate among decision makers across almost all the firms irrespective of firm size and industry ownership.

7. THE LESSONS

> "Theory is when you know everything but nothing works. Practice is when everything works but no one knows why. In our lab, theory and practice are combined: nothing works and no one knows why." (Anonymous)

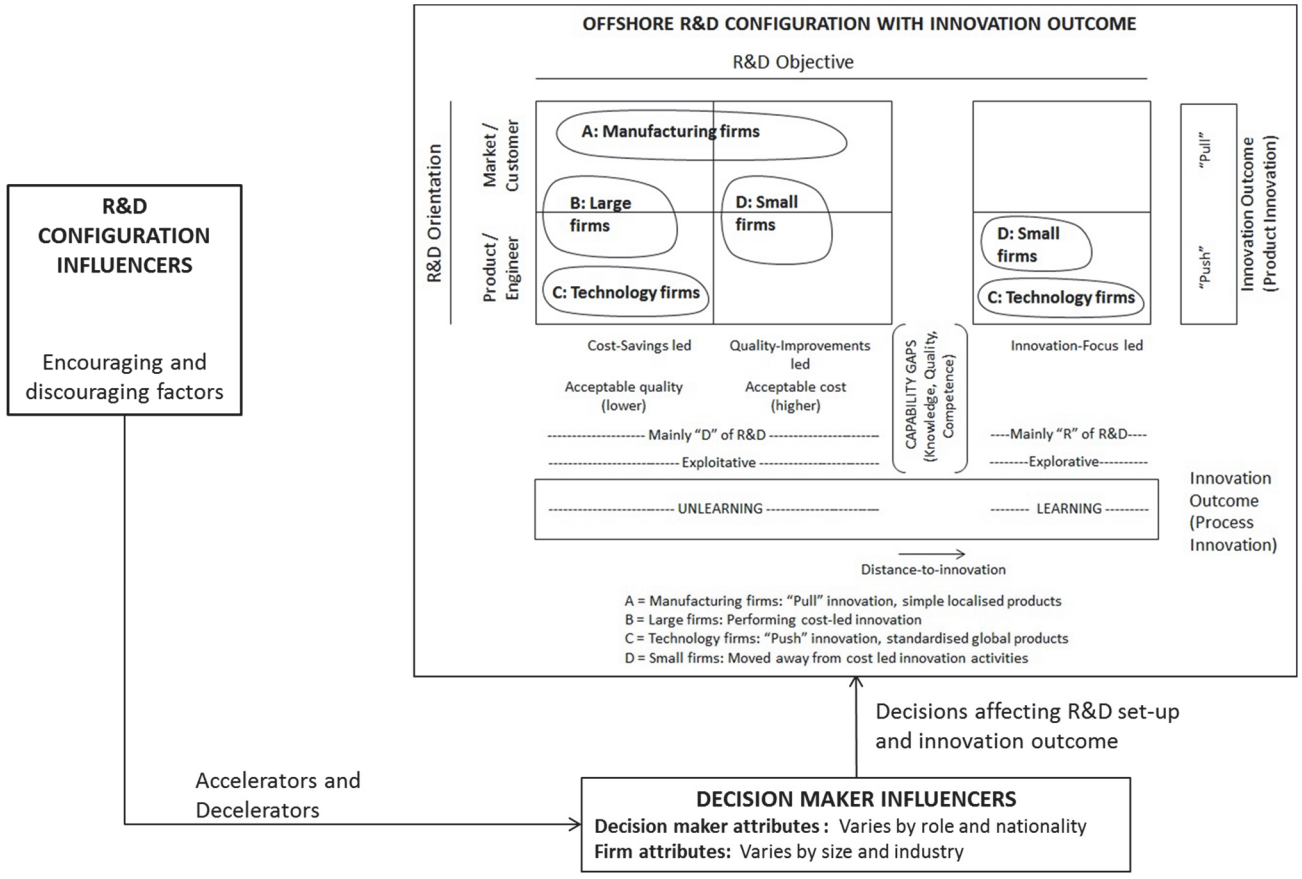
Chapter Summary: The contributions to both theory and practice are developed and explained here. This study contributes to both strategic management and international business with new results for offshore R&D configuration, unlearning-as-innovation and distance-to-innovation, and the influence decision makers' attributes have on offshore R&D. For practice, the contributions are an increased understanding of capacity versus competence, exploring skills versus activities, and appreciating the utility of unlearning.

The Full Picture

Combining all the results discussed in the previous chapter, I develop a picture of the decision process for the offshoring of R&D. This is presented as a consolidated set of all the findings and is shown in figure 6. The process starts with the decision making criteria and the views of the offshoring. The decisions that are taken emerge as a result of the viewpoints of the decision makers both as individuals and as a group which becomes the viewpoint of the firm. The influencing factors for the individual vary by role and by nationality, whether the decision makers are in the management or the technology function, and whether they are Indian or Swedish nationals. Their views can diverge within firms and can converge across firms showing that often similar groupings lead to similar views irrespective of the firms The collective views of the decision makers vary by the size of the firm size and the industry to which the firm belongs. The R&D configuration depends on the R&D objective for the firm and its R&D orientation.

A firm's orientation can be outward-looking or *'extroverted'*, where the market or the customer is the primary strategic focus. Such firms exhibit *'pull'* innovation. A firm can be inward-looking or *'introverted',* where the product or the engineer is the strategic focus. Such firms exhibit *'push'* innovation. The objective of a firm is one of three value drivers. A firm can seek value from cost-savings led, quality-improvements led or innovation-focus led innovation. Depending on where a firm is in this matrix, it innovates differently. Firms where the objective is cost-savings led or quality-improvements led arrangements are exploitative in their intent while innovation-focus led firms are explorative in their intent. Firms in cost-savings led and quality-improvements led configurations are on the *'unlearning'* path where knowledge process and products are simplified and adjusted to lower specifications in order to satisfy the lesser advanced industry segment offshore. Firms in innovation-focus led configurations are on the *'learning'* path where knowledge process and products are the same as the European offering and firms are seeking improvements on these. The innovation outcomes that result from the R&D configuration are thus either product innovation in the form of push or pull innovation or process innovation in which case they are on the unlearning or the learning paths. For firms to exist in the innovation-focus led configuration, there is a gap the firms may need to cross. This gap exists because of dissimilarities between Sweden and India in knowledge, competence levels, product specifications, and the understanding of quality. These are capability gaps and they create a *'distance-to-innovation',* which indicates how far a firm is from delivering on learning or the progress to innovation-focus led activities. How the R&D configurations are established and what activities are performed offshore is a reflection of the logic of the decision making. The *R&D Configuration Influencer* described earlier as a set of factors, is explained as a group of individual level, firm level, and environment level criteria. These criteria arise from the decision maker's own experience and viewpoints, the firm's experience and goals, competition, and external environmental forces. How the decision makers use this information decides to a large degree the establishment of the offshore R&D centre and its subsequent progress. The distance-to-innovation depends on some of these influencing factors and on how well analysed and managed these factors are.

Figure 6: The Offshore Decision Process - Consolidated results



Contributions to Theory

I develop and propose results which are the crucial messages to learn from this thesis, and contribute to the theories on which this research is based. The aggregated results answer the research questions and extend the theories in international business and strategic management with a focus on R&D internationalisation and its related decision making.

International Business

R&D configurations are specific combinations of factors that produce a particular innovation related outcome (Fichman, 2004) insofar as new service adoption does not depend on individual service attributes but rather on specific configurations of those attributes (Ordanini, Parasuraman, & Rubera, 2014). These configuration choices vary on the size of the firm and the industry it belongs to. A larger firm has a different strategy for R&D in India than a small firm has and the same goes for firms from different industries. How they configure the R&D facilities are also different based on the objective of their activities. Firms derive different values from these arrangements abroad. As discussed[22], there are many types of ways in which innovation is being delivered from India. Technology firms are closer to performing innovation-focus led activities than are manufacturing firms, and innovate differently on their product portfolio, so they are configured differently offshore and that is a result of the decision choices of each.

In the R&D configuration, either cost or quality may be compromised by the firm in order to achieve the result that the firm is looking for. This thesis established that in order to derive value from innovation it is not necessary for either parameter to be accepted at a poorer level. Firms deriving value in cost-savings led innovation could settle on lower acceptable levels of quality, while firms deriving value in quality-improvements led innovation could settle on higher levels of cost, while firms deriving value in innovation-focus led innovation may or may not accept lower quality and higher cost levels. For each configuration, different innovation outcomes

[22] Refer to the *Offshore R&D Configuration* model on page 130

emerge. Each of these innovation outcomes is either product innovation or process innovation and this depends on the type of R&D configuration the firm has offshore. Thus a firm innovates depending on the R&D configuration it has offshore. My thesis is, to the best of my knowledge, the first to suggest that the R&D configuration offshore depends on the capability and activity of the firm and is also the first to suggest a relationship between the R&D configuration offshore and the resultant innovation outcome.

For example, at a firm level, consider firm F10. This is a small manufacturing firm that established an R&D centre in India to develop a highly sophisticated product which was similar to its global product. When I transformed the activities and capabilities of F10 into an R&D orientation and R&D objective (as is shown in the transformation tables 29 and table 30), I established that F10 was configured to perform innovation-focus led R&D in India (as is shown in figure 4). The innovation-focus led R&D results in a firm on the learning path of process innovation. As the R&D orientation of F10 is product centred it results in product innovation whereby F10 is producing a standard global product in a form of push innovation. At an aggregated level, consider manufacturing firms for example (as shown in figure 6). They are generally configured to produce simpler products that are market or customer dependent and are established to find cheaper methods of product development or to produce value solutions. Manufacturing firms in this study tended to have their R&D orientation to be market or customer centred wherein they are producing market specific products in a form of pull innovation. From the results of my thesis, I propose that:

> *Proposition 1a: When a firm's R&D is internationalised, its R&D configuration offshore depends on the capability it possesses and activity it performs.*

> *Proposition 1b: When a firm's R&D is internationalised, its innovation outcome depends on the R&D configuration it has offshore.*

Learning and innovation are related to each other in organisational outcomes. Firms invest in R&D not only to pursue directly new process and product innovation but also to generate information (Cohen & Levinthal,

1989). This learning has normally been researched from the education side but not so much from the demand side as innovations are today viewed as a function of the learning and knowledge creation (Ellström, 2010) where innovation driven learning finds its way into new product development through conversion strategies of internalisation, socialisation, combination and formalisation (Zhang, Lim, & Cao, 2004). Most of the previous theories discuss learning as innovation but I found in my study that unlearning is also a strategic method (and outcome) of producing innovation. Unlearning as innovation is required for firms to operate in (possibly) developing economies and markets which are not ready for advanced product development techniques and in markets where customers are not willing to pay for expensive offerings. Unlearning to develop a simpler offering is a form of process innovation and is used by firms to compete in such markets. As can be seen in figure 6, unlearning is generally true for manufacturing firms and large firms that operate on cost-savings led and quality-improvements led innovation because they tend to produce lower specification products that are specific to the Indian market. Even from my prior professional experience from working as an engineer, unlearning is a difficult task because engineers are trained to find ways of devising more sophisticated technologies and products, so this is an activity that runs counter to their mindset and education. Unlearning is, however, innovation because the means of devising ways to produce a simple product requires many changes to organisation processes, and this leads to process innovation. Technology firms and small firms in the study are operating in an innovation-focus led configuration where they are in the traditional learning path and deriving value from learning to produce new products. Technology firms in India are able to do this because the Indian market is willing to accept more sophisticated products while the manufacturing segment in India is still somewhat traditional and has more price-sensitive customers. No previous study has discussed unlearning in internationalisation, as far as I know, so my thesis is the first to show unlearning as a form of innovation in internationalisation situations. From the results of the thesis, I propose that:

> *Proposition 2: When firms internationalise their R&D in markets that accept lower specification products then unlearning can lead to innovation.*

So, are firms achieving innovation from offshore? As I have shown in this thesis, there are various ways in which innovation is performed offshore, and this is explained by the innovation outcomes abroad. These are all establishments in some form of R&D arrangement, and they derive different types of values from innovation. In the cost-savings led and quality-improvements led derivatives of innovation, there is an unlearning path while in the innovation-focus led arrangement there is a learning path. Transitioning from unlearning to learning involves bridging a gap which comprises various dissimilarities between the home and the host facilities. I propose the term '*distance-to-innovation*' which signifies how far removed firms are from performing traditional learning driven innovation activities in their offshore R&D centres. This is a new term that leads to a new concept in innovation at offshore locations. The closer the capabilities are between the home and host centres, the shorter this distance is, and the closer the R&D centre tends to be to the learning path. Distance-to-innovation is a combination of the dissimilarities mentioned below. Innovation performed offshore can be progressed with and optimised if the causes or the effects of the following dissimilarities are closed or minimised:

- Competence level dissimilarities
- Technical knowledge dissimilarities
- Product specification dissimilarities
- Quality understanding dissimilarities

These dissimilarities can exist because of different stages of maturity between the home and host, possible inefficiencies in knowledge flows, differences in engineering and scientific understanding, and dissimilarities in work practices. They can also be a result of differences in technical education, quality acceptance conditions or variations in product knowledge, for example, none of which may be a result of maturity level differences between the Swedish and Indian R&D centres. Distance-to-innovation tends to be somewhat related to the logic of the decisions.

Considering firm F1 as an example, decision makers raised concerns about the quality level of engineers in India and the difference of the understanding of quality between Sweden and India as issues that were ham-

pering the firm, as was the lack of technical knowledge within the Indian centre. These contributed to the firm not being able to produce innovation-focus led R&D in their Indian centre because they just didn't possess the required capabilities for it. On an aggregated level, smaller firms do possess the required capabilities to generate innovation-led R&D in the India centre. The firms such as F2 and F10 are able to use their smaller size as an advantage and are nimble enough to be able to adapt quickly to change and can acquire relevant capabilities. Although F10 finally had to re-shore the Indian R&D operations to Sweden, it was not because of the dissimilarities of capabilities. They did possess everything they needed to develop innovation-focus led solutions from their Indian operation. It was only because the Indian market as a whole was not ready for their sophisticated product. From the results of my thesis, I propose that:

> *Proposition 3: When firms internationalise their R&D, a 'distance-to-innovation' can exist because of dissimilarities in competence, knowledge, and quality understanding conditions between home and host R&D centres.*

Strategic Management

The current theories of decision quality and decision support explain the effects of exogenous and endogenous factors and individual and cognitive factors on decision quality. Depending on the decision-maker quality, decision quality may improve or degrade when information quality improves (Raghunathan, 1999) and the outcome is dependent on both the environment (exogenous factors) as well as the choices made by the decision makers (endogenous factors) (Davern et al., 2008). According to Davis & Kottemann (1994), users overestimated their own performance when the environment factors matched their views of the problem. These are experience and confirmation factors that influence the choices made by a decision maker. Such decision maker held views arise from their individual expertise and the environment the decision maker is in.

I can sum up the offshore decision criteria as a set of decisions that arise from a collection of views. In this thesis, two different sets of viewpoints are explored, and decisions arise for these two intertwining sets of

opinions. These are the individual viewpoints held by the decision makers and the collective viewpoint held by decision making group of the firm, of what offshoring of R&D is. A decision maker is either a citizen of India or Sweden and performs a particular role within the organisation, which in the context of this study is either the management function or the technology function. As discussed, these two together form a kind of a decision maker grouping and leads to a viewpoint which, for certain themes, appears to diverge somewhat from other decision makers within the same firm while converging across firms with decision makers in the same role and having the same nationality. This happens because the motivations of belonging to one group can be different from those who belong to another group. Even within the same firm, a decision maker who is Indian, might see benefits and challenges associated with offshoring R&D differently than one who is Swedish. This is not a difference that can necessarily be attributed to culture, but it is rather a difference of viewpoints based on what they see (and often assume) from their professional experience and implicit knowledge of the local environment. Decision makers attribute different importance to the same criteria depending on where they are from, and this leads to a different viewpoint in their recommendations. This also applies to those who are in different roles. A decision maker in a technology function views R&D offshoring quite differently from one who is in the management function. They also attach different importance to the same things, perceive different challenges, and are possibly driven by different potential outcomes. The two functions may also view R&D differently and that happens because the technology function is 'closer' to the R&D activities than is the management function. This leads to decision makers in technology functions possibly expressing similar thoughts across firms and the same applies to the decision makers in management functions. We can see from the thesis results that the viewpoints of the decision makers converge across firms for the same functions.

Firms in this thesis have been classified as large or small, and belonging to the manufacturing or technology sector. Decision makers who belong to a particular firm, aggregate their choices to arrive at a common set of decisions concerning the offshoring of R&D. This is a result of the firm's overall goals and motivations for performing R&D in India. The collective

viewpoint of firms on what constitutes R&D varies according to what the firm does. In the discussion, we saw that while most firms in the study view R&D as some form of product development, this definition also varies according to whether a firm is large or small. This is because of what the firm is trying to achieve with product development in India. Even the motivations to go offshore reflect different viewpoints across firms. Whether a firm seeks traditional reasons to try innovating from abroad or it seeks some strategic or competitive outcome, reflects in the collective decision choices of the decision makers within those firms and converge across firms of similar types.

To revisit an example from the analysis discussed in the previous chapter, when we look at table 34 and the analysis that followed it, resource confidence is an area of differing viewpoints amongst groups of decision makers. Swedish decision makers who were part of the technology function were more concerned about the lack of quality emerging from the Indian centre than the Indian decision makers were. This suggests a difference in understanding of what constitutes quality and is a convergence of viewpoints across firms for Swedish decision makers in similar functions. It is possible that the Indian decision makers have a lower threshold than Swedish decision makers have, for what indicates good quality. This suggests a divergent viewpoint between Swedish and Indian decision makers within the same firm. When discussing motivations to offshore, small firms particularly F2, F7, and F10 are most closely configured to perform innovation led R&D offshore which indicates somewhat similar thinking for the decision makers from similarly sized firms. This convergence can be observed from tables 35 and 36 and the explanations that followed from these. From the results of the thesis, I propose that:

Proposition 4a: The viewpoints of decision makers may converge across firms and diverge within firms, depending on whether they are in the technology or management roles and whether they are home or host country nationals.

Proposition 4b: The viewpoints of decision makers may converge across firms depending on the whether the firm is small or large and whether it belongs to the manufacturing or the technology industry.

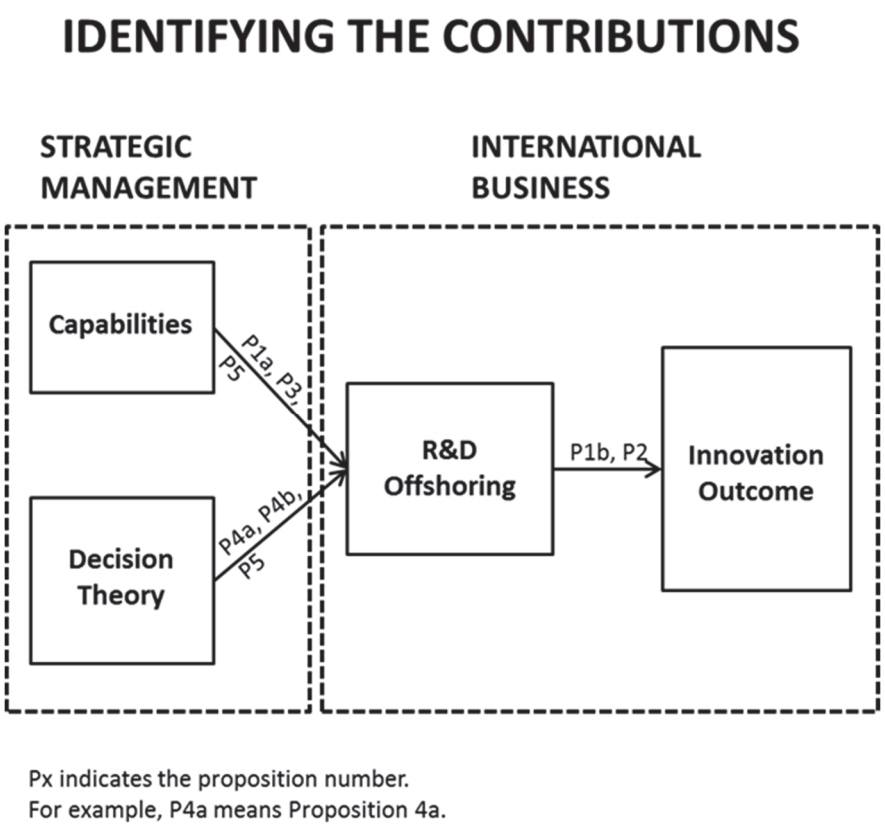
The discussion in this thesis results in a contribution to decision theory that is applied specifically to the offshoring of R&D. In this thesis, I suggest individual, firm and environment factors that play an important role in the decision making process of R&D offshoring. The encouraging factors work towards legitimising or justifying a decision maker's choice. These factors come from his or her experience, from the firm's experience, goals, and strategy, and from the environment and are what I called *accelerators*. Decision makers use this information to arrive at the choices leading to the offshoring. Their viewpoints within a firm can vary for the same criteria, as I showed in the previous contributory propositions but they are still using these factors to assess their decision choices. How well they utilise the available information is an important precursor to the type of R&D configuration that is established offshore. There is also a set of discouraging factors that affects the progress of innovation offshore. These are hindering or inhibiting factors and are what I called *decelerators*. As with accelerators, these are individual level, firm level, and environmental factors. Decision makers interpret these factors differently, and this also results in different ways R&D has currently been established for a particular firm. How these decelerators are managed will result in different outcomes to the progress of innovation. In the most extreme case discussed firm F10 which had established R&D centre with an innovation-focus led configuration had to close its centre and re-shore to Sweden because of strong decelerators that proved unable to manage or to minimise. This is indicative of the logic of the decision making that did not fully consider the magnitude of the negative effect of the inhibiting factors. Decision logic is explained by considering both the accelerators and decelerators, and can be affected by maximising the knowledge gained from the accelerators and minimising the influencing effects of the decelerators. Revisiting the discussion in the R&D configuration influencers section, consider for example the small firms F2, F7, and F10. The decision makers from these firms believed that there was a need to introduce a new technology to the Indian market and a need to transform the market. This resulted in the decision makers of these three firms establishing the offshore centre to produce an innovation-focus led R&D configuration. The factor for the need to develop a market resulted in this setup of their offshore configuration. In another example, con-

sider the large firms F4, F6, F8 and F9. The decision makers from these firms discussed the issue of engineers not being able to visualise the entire product and this was affecting the way R&D activities were being performed in the Indian centre. This inability to see the entire product occurs after the offshoring has been done and affects the innovation outcome of these firms. Thus, from the discussion in the previous chapter, I propose:

> *Proposition 5: The set-up of the offshore R&D configuration and the resultant innovation outcome are affected by accelerators and decelerators.*

Figure 7 reconciles the propositions developed, by identifying where they contribute to in the theoretical framework that was discussed in chapter 3, and as mentioned in table 9 on page 35.

Figure 7: Reconciling the propositions



Contributions to Practice

What does this thesis mean for practitioners and what could they learn from the findings? The setting of this thesis is specifically for Swedish firms with a research and development facility of some sort in India, and the results of this study can be used by decision makers to make better choices concerning the offshoring of R&D of their firm to India. The findings can also be considered in other internationalisation scenarios of a similar nature, for example, when a firm in an innovation intensive, developed economy offshores its R&D to an emerging country that is less knowledge intensive. Firms are innovating from India but not necessarily deriving value from innovative activities. Research is usually a luxury for a firm because it is expensive for firms to have people working in activities that might not realise monetary benefit at all or only after several years. The temptation is thus to achieve shorter-term gains by seeking cost or efficiency gains in innovation, as reflected by the some of the firms' positioning in the offshore R&D configuration matrix. A firm's R&D configuration could be adjusted such that more decision makers look to achieve a different innovation outcome from their R&D centres by moving away from cost and quality objectives after establishing acceptable levels for both and by bridging the capabilities gap between the unlearning and learning paths.

Clustering and Herds

Decision makers perceive a high opportunity cost in not going to India. This 'need' to be in India is a fear of missing out and is not necessarily driven by the possible benefits of being there but rather the potential loss of not being there. Firms are agglomerating, both internally where they are consolidating their activities by collocating R&D function with the production function, and externally where they are collocating with their competition. The key issue here is whether it is necessary to have an R&D function at all if primarily production activities are being performed offshore. As we confirmed earlier in this discussion, many activities in the R&D centres in India are production support activities. These could be performed in the

production unit itself. Decision makers could think about the optimal configuration of production centres in such cases.

High Technology Skills vs Low Technology Work

The work performed in many R&D centres in India is non-critical and routine work. Work that is at the forefront of technology or engineering is often not offloaded to India, and according to the decision makers it is unlikely that such work will be performed from their firms' Indian facility. Activities which are repeatable and of lower specifications are carried out from India while the more knowledge-intensive and critical activities are handled from the Swedish or other European facilities. Although one key driver to go to India is the presence of a large number of highly skilled engineers and scientists, this allocation of lower specification work is not optimal utilisation of these personnel. This is possibly a somewhat short-term focus in trying to gain benefits from the market. While quickness to market is important to the business it may not necessarily be the motivation for delivering innovation. Swedish R&D centres in India are still mainly 'D' factories with only a few performing the 'R' function.

Perceptions of R&D 'Distance'

The perception of distance is an interesting discussion in this study. It varies according to the size of the firm and the industry to which the firm belongs. For manufacturing firms, geographical distance appears to be more significant than it is for technology and services firms. Manufacturing firms are possibly more expensive in the initial investment required, and this can lead to a more cautious view the further away the centre is from the critical engineering functionality. Also, for smaller firms distance appears to be a factor of lesser importance while distance can be a considerable challenge for larger firms. Geographical distance also manifests in greater need for management intervention and operational control from headquarters. These factors can be detrimental to the progress of innovation. Distance parameters affect the R&D investments, knowledge flows, and the nature of innovation performed. Decision makers will do well to bridge this dis-

tance to progress on innovation activities by searching for better ways of coordination, communication, and knowledge distribution. This is essentially a confidence-building exercise between the home and host centres.

Engineering Capacity vs Engineering Quality

India provides a large number of engineers every year from its many thousands of engineering schools, but the competence level of the engineers is not always acceptable. As some decision makers mentioned, the difference in quality between a good engineer and a bad engineer in India is quite wide, unlike in Sweden where the difference in the quality of skills is much narrower, so the skill level of most engineers in Sweden are similar. This difference in competency quality leads to a lack of understanding of engineering functions, designs, machines, and leads to an increase in inefficiency. The decision makers who talk about flexibility and scalability, and thus go to India in search of large numbers of resources need to guard against such competency issues. This is because such issues may lead to an innovation 'loss' as more investments of time, knowledge management, and coordination would be needed to raise the offshore competence to acceptable levels. Addressing the gap at the source will somewhat mitigate this challenge.

Unlearning

In the case of manufacturing firms, the Indian customer is not prepared to pay for products of European sophistication at the prices they are. The result of this is that firms are constantly in search of ways to develop a 'value' product with reduced specifications and some compromise on quality. Searching for methods to develop a somewhat basic product with less advanced functionality is a challenge for engineers because an engineer's mindset and training is always aimed at trying to develop ever better products with more advanced functionality and increased sophistication than earlier product versions. The basic, simpler products that are accepted in India require a degree of 'unlearning' in terms of simplification of designs and processes. This can be more difficult to do than advancing and improv-

ing designs. The unlearning process in an R&D centre is a cost to a firm, and it doesn't lead to conventional innovation other than devising a solution that is simpler than the standard offering. Gaining quick access to a market for sales versus furthering product innovation is a dilemma decision makers may need to think about with their offshore R&D strategy.

8. FINAL THOUGHTS

This thesis develops an understanding of the viewpoints of the decision makers in Swedish firms, and their decision making process when they choose to offshore part of their R&D functions to India, and this results in certain innovation outcomes. This thesis is broadly applicable to the manufacturing and technology sectors and provides a generic framework that will assist in building some degree of expertise in the offshoring of Swedish R&D to India. The research has a few possible commercial and academic uses. Firstly, the study can be a useful guide in establishing India specific research centres in universities, where India targeted offshoring and entrepreneurial entry models can be explored and developed. Secondly, this study is of specific interest to a Swedish firm that either already has a presence in India or is looking to expand via offshoring. The lessons discussed and the obstacles to the progress of innovation specifically the accelerators and decelerators can be especially useful to the decision makers who are faced with similar decisions. Thirdly, the offshore R&D configuration can be expanded upon and used to develop further practical roadmaps specific to an industry or a geography. Academically, this study explores a possible link between offshore R&D arrangements and resultant innovation outcomes, which is an area of research that is not well studied. The accelerators and decelerators discussed can be utilised in other contexts of strategic decision making. The importance of unlearning as a method of innovation in lesser knowledge intensive markets can provide interesting research opportunities. The progress from unlearning-as-innovation to learning-as-innovation is an interesting opportunity for further studies. Furthermore, this thesis does not discuss innovation performance, so it will be an interesting possibility to explore how the offshore R&D configuration developed in this study may be linked with innovation performance.

This research has several limitations, the first of which is its specific Sweden-India setting. Although according to Flyvbjerg (2006), generalisation is overrated as the source of scientific progress, this study develops a generalisable picture of the how decision makers of a firm affect the firm's R&D set-up offshore. The thesis develops a process which can be tested in future studies for similar settings and situations. Whether the results can be extended to other combinations of home and host countries where the home country is a developed and innovation-intensive economy and the host is an emerging economy with a disorganised innovation policy, is a subject of further research. Also, whether the results can be extended to include the Scandinavian region as a whole is a topic that needs to be explored further. Secondly, this study includes some cultural context which does not translate easily into predictive models. Moreover, this thesis does not distinguish between various types of cultures other than identifying whether a manager is Swedish and Indian and using that as a differentiator. Thirdly, for specific cases within a particular industry sector, a detailed study will need to be undertaken to consider only for that case. Birkinshaw, Brannen, & Tung (2011) remind us that exploratory research does not imply an absence of theory. Further to this belief the knowledge emerging out of this study, while possibly not generalisable, is not an indicator that the contribution does not add to the knowledge accumulation in the field of strategic management.

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Appendix

Glossary of Abbreviations in the Thesis

IT	Information Technology
R&D	Research and Development
FDI	Foreign Direct Investment
HBE	Home-base exploiting
HBA	Home-base augmenting
HBR	Home-base replacing
ICT	Information and Communications Technology
IB	International Business
M&A	Merger and Acquisition
DDT	Design, Development, and Testing
OLI	Ownership-Location-Internalisation
DLE	Disintegration-Location-Externalisatio
TCE	Transaction Cost Economics
RBV	Resource Based View
CEO	Chief Executive Officer
CTO	Chief Technology Officer
COO	Chief Operating Officer
VP	Vice President
IP	Intellectual Property
RPC	Regional Product Centre
MBA	Master of Business Administration
PhD	Doctor of Philosophy
MNE	Multi-National Enterprise
RQ1	Research question 1
RQ2	Research question 2
RQ3	Research question 3

List of Tables and Figures in the Thesis

Survey Questionnaire

What is the name of your firm?

Does your firm have an R&D centre / lab in India? (This could be a facility for product R&D, process R&D, basic research, applied research, product development, or something else)

- Yes
- No

What kind of R&D does your firm have in India? (Select any responses that apply to your firm)

- Product development
- Process development
- Basic research
- Applied research
- Others
- We don't have such a facility in India

When was the R&D facility established in India?

- Less than 1 year ago
- 1 - 5 years ago
- 5 - 10 years ago
- 10 - 20 years ago
- More than 20 years ago
- We don't have such a facility in India

Approximately how many employees are in the R&D facility in India?

- 1 - 5
- 6 - 50
- 51 - 500
- 501 - 5000
- More than 5000
- We don't have such a facility in India

Would you be willing to participate in an interview process with our school to help us explore and understand your R&D offshoring?

- Yes
- No
- Maybe

Interview Guideline

GENERAL QUESTIONS FOR POSSIBLE ANSWERS TO RESEARCH QUESTIONS	
1. What is your R&D / innovation strategy?	RQ1, RQ2
Seek answers on	
-Motivations	
2. Why did you offshore innovation?	RQ1
Seek answers on	
-Motivating factors	
-Perceived benefits	
3. Could you describe your decision making process?	RQ2, RQ3
Seek answers on	
-People and process	
-Decisions made	
4. What activities are performed at the offshore centre?	RQ1, RQ2
Seek answers on	
-Tasks performed	
-Type of R&D	
5. How did you evaluate the choices made?	RQ2, RQ3
Seek answers on	
-capabilities (resources, skills, technology…)	
-markets, competition, environment	
6. What are some of the challenges, concerns or dilemmas?	RQ2, RQ3
Seek answers on	
-Challenges, dilemmas in decision making	
-Post-entry issues, concerns	
7. What advantages did you look for, and receive?	RQ1, RQ2
Seek answers on	
-Perceived and actual benefits	
8. What is the outcome of having the centre?	RQ1, RQ2
Seek answers on	
-Benefit of the centre	
-Progress of innovation	
9. How has your offshoring experience been?	Generic
Seek answers on	
-Cultural issues	
-Challenges, achievements	
-Performance	

Mindmaps and Illustrations

Presented here are hand-drawn illustrations, in the form of mind-maps that show a summary that formed some of the literature review that served as the basis for this study. The illustrations cover some topics I read in R&D offshoring and strategic management. These illustrations show some of the major themes along with the authors who contributed those themes. These articles provided some of the literature that is relevant for this study. I have also provided a hand drawn illustration of the entire research study in a nutshell as a one page take-away which informs the reader about the complete research from the literature, to the questions, method, and contributions.

Figure 8: Relevant articles on R&D Offshoring and its considerations

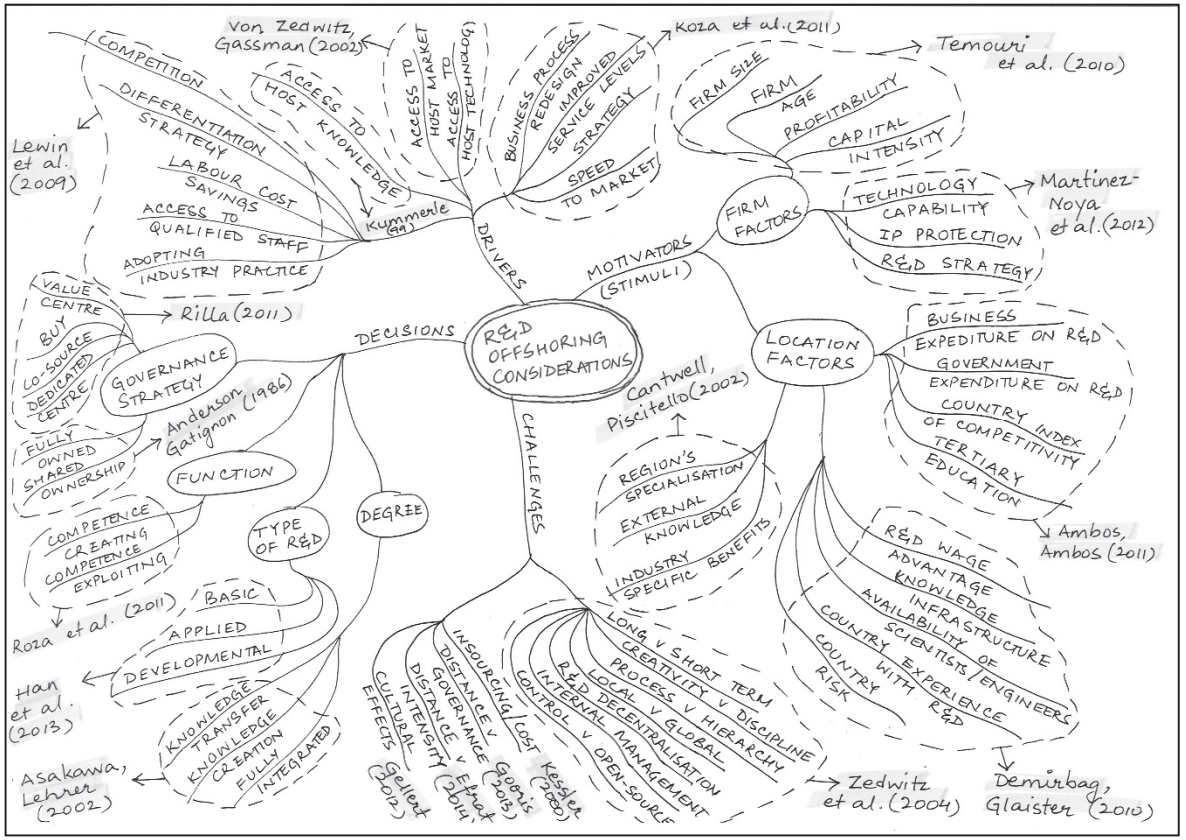

Figure 9: Relevant articles on decision making, capabilities, and innovation

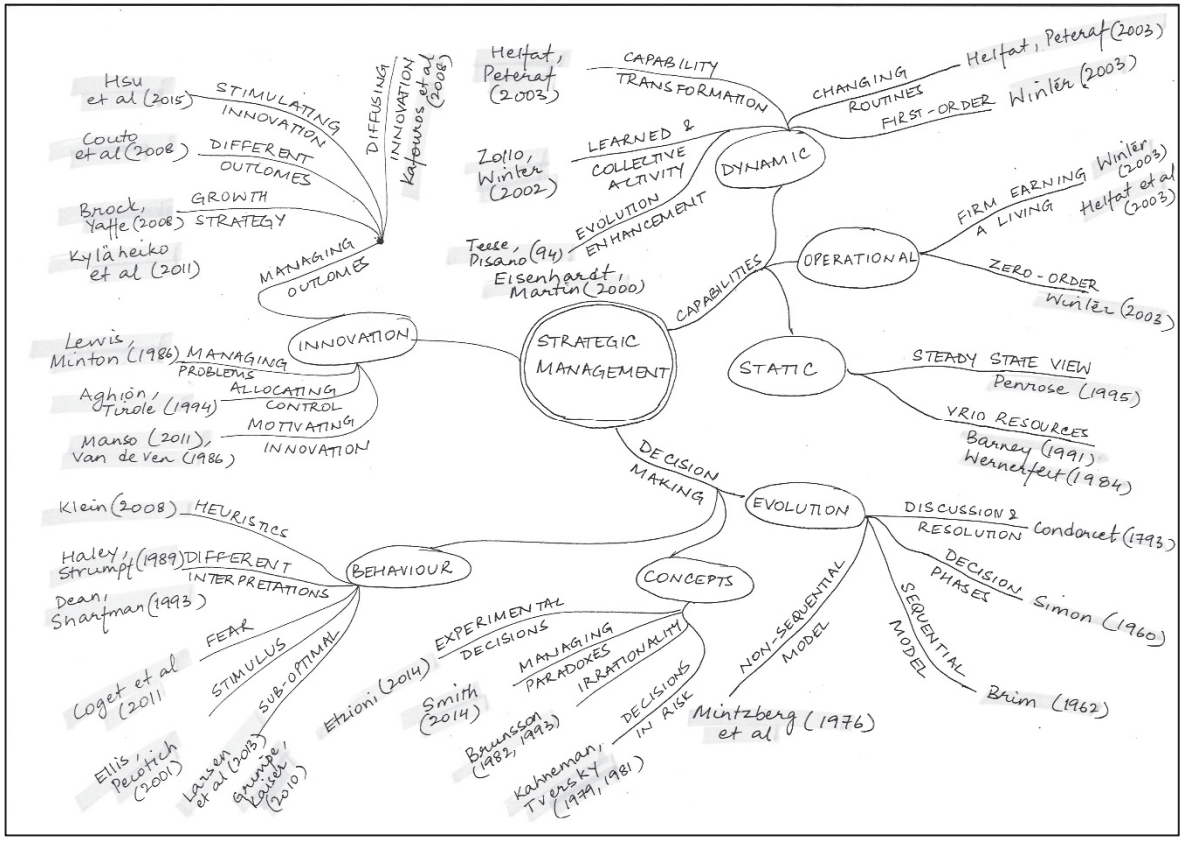

Figure 10: One page take-away of the thesis