

**Organizational innovation processes and network relationships
development**

*“The case study of
Athera Biotechnologies AB and
AstraZeneca R&D”*

by

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Abstract

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Title: Organizational innovation processes and network relationship development-
“The case study of Athera Biotechnologies and AstraZeneca R&D”

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Research Problem: It has been known that developing a novel drug in pharmaceutical companies is a complex and expensive process. A company within these industries is forced to increase its innovativeness in order to compete with others. In this case study we will examine Athera Biotechnologies AB and AstraZeneca R&D respectively and how both companies promote, develop, sustain and enhance organizational innovation. At the same time we will also examine what is the two companies’ business strategy when it comes to networks relationship development.

Aim of thesis: The main purpose of our thesis is to compare two Swedish pharmaceutical companies and to see what are the differences and similarities in the way they foster organizational innovation processes.

Method: The method used for analyzing the collected data and information in our research is qualitative. We decided to use this method to examine the two companies’ organizational innovation processes and networks development. Further on we have collected both primary and secondary data. Primary data was collected through two semi-structured interviews with open questions. Secondary data was gathered from companies’ official web sites, annual reports and different publications and articles.

Conclusion: Our findings indicate that organizational innovation is crucial for pharmaceutical and biotechnological companies to sustain their competitive advantage in the rapid changing environment within this industry. Further more, entrepreneurial culture, corporate culture and networks and partnerships are the main factors that help AstraZeneca R&D and Athera to develop, maintain and enhance their organizational innovation. This in turn leads to the ability of the firms to successfully propose, adopt, develop and implement any new idea in relation to certain product or process.

Key words: Organizational Innovation, Entrepreneur Culture, Corporate Culture, Networks and Partnership, Entrepreneurship

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Marina Tasheva & Patchara Thaisrivichai

Abbreviations

CC (Corporate Culture)

CRO (Contract Research Organization)

CVD (Cardiovascular Disease)

EC (Entrepreneurial Culture)

GOV (Government)

KD (Karolinska Development)

KI (Karolinska Institute)

MNC (Multinational Company)

OI (Organizational Innovation)

R&D (Research and Development)

SME (Small and Medium Size Enterprise)

TM (Top Management)

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1. Introduction

Pharmaceutical Industry is one of the fastest growing within Sweden. During 2005, the industry employed about 22,000 people. More than 90 percent of its sales were exported, for a total of more than SEK 46 billion or 5.0 percent of Sweden's overall exports. This gives Sweden a positive trade balance in pharmaceuticals amounting to SEK 32 billion. During the 1980s, a large-scale restructuring of the Swedish pharmaceutical industry began in the form of merger and acquisitions, most of them international. The seven drug companies that existed at the beginning of this period had soon been reduced to two large multinational companies (MNC) – AstraZeneca and Pharmacia. The next step in the development process of the industry was internationalization. Pharmacia bought in 1993 the Italian company Farmaitalia Carlo Erba and continued with two mergers with UpJohn in 1995 and with Monsanto in 2000. In 2003 the worlds biggest pharmaceutical company, the American Pfizer bought Pharmacia¹.

Medicine development is one of the major reasons for the transformation of the Pharmaceutical Industry. It is a very complicated and expensive process. It takes approximately 10-15 years to develop a completely new medicine. The cost of the development of new medicine for one company, including all the resources needed is between 1-10 billion Swedish kronor. This is a reason why we see today more and more companies in the industry producing new variations and new generations of already discovered medicine. Only one third of the medicines on the market are able to cover their own development cost. In order to secure their future and compete with the increasing competition, the pharmaceutical companies need to increase their innovation capacities².

Although the industry is dominated by Big Pharmaceutical companies, young biotechnology companies have shown growth in a number in years. Swedish small and medium sized (SME) biotechnological companies have increased from 136 in 1997 to 213 in 2003³. The Swedish government at the same time provides favorable environment for the development of highly educated scientist⁴

Biotechnological companies are defined by strong connection to academia and scientists are considered to be the founders in most cases of these start-up biotechnological firms (Nilsson 2001, p.93). Another interesting fact is that in most of the time scientists like to develop their small biotech firms closer to scientific "clusters" rather than near larger organizations (Nilsson 2001, p.93). The importance of scientific clusters was mentioned also by Carl Sundberg. According to him, Sweden and Denmark are "the leaders" when it comes to biotechnological and pharmaceutical science. Which in turn makes them favorable clusters where pharmaceutical and biotechnological companies can flourish (C. Sundberg 2008,

¹ Biotechnology and Pharmaceuticals in Sweden, Swedish Institute, August 2007
http://www.sweden.se/templates/cs/FactSheet_17268.aspx

² Om läkemedelindustrin, Unionen, January 2008, https://www.unionen.se/Templates/Page_29649.aspx

³ Biotechnology and Pharmaceuticals in Sweden, Swedish Institute, 2007
http://www.sweden.se/templates/cs/FactSheet_17268.aspx

⁴ Pharmaceuticals, biotechnology and medical technology – an Integral Part of Innovative Sweden
http://www.swedenbio.com/upload/Publications/Reports/Government%20Strategy%20document_biot ech2005.pdf

interview, 28 April). Biotechnology is not an industry but set of technologies in various fields such as pharmaceuticals (Staropoli, 1998 p.14). One example of such company is Athera Biotechnology AB, created in 2002 in order to commercialize the innovative discovery made by Professors Johan Frostegård and Ulf de Faire on the significant role of phospholipids antibodies (aPL) in the inflammatory process of early CVD (cardio vascular disease).

According to UNIONEN, which is the biggest trade union in Sweden as of 2007, there has been discussion in Sweden in recent years of what is influencing new SME pharmaceutical company to flourish better than before⁵. One reason may be the emergence of Contract Research Organizations (CRO) which offers different kinds of pharmaceutical research service. A lot of MNCs have turned to use their services in order to reduce research cost and the risk of having their own research projects. On the other hand, others such as AstraZeneca expand their R&D departments through merger and acquisitions by which they have access to external innovation (AstraZeneca Annual Report, 2007). Another reason may be the desire of university researchers to commercialize their knowledge and discoveries in the pharmaceutical area, such as the case of Athera Biotechnologies AB⁶.

It will be very interesting to look into one small company like Athera and one big like AstraZeneca and see the differences and similarities in their organizational strategies concerning innovation and entrepreneurship. Since the two companies are different in size, age, technology, nature of products, and since our paper will focus on the way they promote, create and sustain innovation and entrepreneurship, we will concentrate only on the R&D (Biotechnology) department of AstraZeneca. In this thesis, we will also examine some other parts of the organization since they might have influenced the organizational innovation to some extent, but will not describe them in detail.

1.2 Companies Background

1.2.1 AstraZeneca

Astra and Zeneca were two companies which had similar science-based cultures and a shared vision of the pharmaceutical industry. This led to the merging of the two companies on 6 April 1999 and a large multinational Anglo-Swedish pharmaceutical company was formed. The merger of Swedish Astra AB and British Zeneca Group PLC develop into the new multinational company called AstraZeneca. The two companies themselves have a long history of innovation and development in the pharmaceutical industry. Adolf Rising, Hans von Euler and Knut Sjöberg established Astra AB company on July 1913 in Södertälje - Sweden to avoid the exaggerate dependence of the German and Suisse companies. In the 50s, Astra already had subsidiaries in UK, Italia, Canada, Germany, Mexico, Colombia and Australia. Zeneca's history is part of the European chemical industry's' history. In 1926, four British companies got together to create Imperial Chemical Industries (ICI chemicals). After 12 years they created a pharmaceutical medical division to research on new medicines. In 1938 the R&D section for biological researches discovered new medicines to control

⁶ Om läkmede lindustrin, Unionen, January 2008,
https://www.unionen.se/Templates/Page_29649.aspx

contagious diseases like malaria. The company opened an ICI Pharmaceuticals Division, in Cheshire in England in 1951. This research centre became famous worldwide.

Nowadays AstraZeneca is one of the world's leading research-driven organizations. The company has a wide range of medicines to fight diseases in important areas of healthcare. The MNC focuses its resources in six therapy areas which consist of some of the most serious diseases. They chose these areas, because their employees' expertise and qualification is best suited for it. These areas include: cancer, cardiovascular, gastrointestinal, infection, and neuroscience and respiratory and inflammation. In the 80s, AstraZeneca was already the biggest pharmaceutical company in Scandinavia with subsidiaries in 20 countries. In the 90s, the firm expanded its international market taking control on the commercialization of its products like Losec (to heal the ulcer), besides the creation of centers of R&D outside of Sweden. In 1996, they signed agreements with famous international laboratories to do the R&D together.

Today AstraZeneca employs over 67,000 employees and it is active in more than 100 countries. The company's sales for 2007 totaled \$29.6 billion with an operating profit of \$ 9 billion. Its corporate office is in London, UK and the major R&D sites are in Sweden, the UK and the US. In addition their global R&D organization consists of offices in France, Japan, China, Canada and India with total employees of 13,000 people. Since this paper will focus on this department mainly it is interesting to note that in 2007 AstraZeneca acquired the US-based biotechnology company – MedImmune Inc. This acquisition will give the company access to external innovation strategies in the area of biologics and vaccines, which is the main area of development for MedImmune (AstraZeneca Annual Report, 2007).

1.2.2 Athera Biotechnologies AB

Athera Biotechnologies AB is a research and development company which develops novel products for risk assessment and treatment of CVD (cardio vascular disease). The company was established in 2002 to utilize findings made by Professors Johan Frostegård and Ulf de Faire on the significant role of phospholipids antibodies (aPL) in the inflammatory process of early CVD. Athera is a company with innovative pipeline of risk markers and drug candidates and the opportunity to provide a true combination of diagnosis and treatment. It is a research and development company, not a contract research organization (H. Grönlund 2008, interview, 16 April). The company has ten employees and is considered as an SME; in fact, there is not yet one fully accepted definition of how many employees must a company have to be considered a small and medium size enterprise (SME). One definition comes from EU Green paper stating that SME consists of minimum 10 to maximum 249 employees. Burns (2005, p.3) on the other hand considers SME as up to 500 employees. However, for our purposes later on in our paper we use EU definition when analyzing the Athera case.

Athera Biotechnologies AB is located in Karolinska Institute Science Park in Stockholm. Each one of the main universities in Sweden has the right to manage its own holding company which in turn can facilitate the early stages of commercialization of new technologies⁷. Karolinska Institute has two entities like this, which are called respectively Karolinska Innovations AB and Karolinska Development. Karolinska Innovations AB was created in

⁷ Invest in Sweden Agency, August 2007, http://www.isa.se/upload/english/Publications/BiotechTools_pdf.pdf

1996 in order to give proficient support in the commercialization of innovations of Karolinska Institute's researchers⁸. Karolinska Development is an organization which captures the unrealized potential of the academic research through commercial development. Athera Biotechnologies AB's competent academic research was approved by Karolinska Innovations AB which in turn forward the company to Karolinska Development once their project was seen as a promising one (H. Grönlund 2008, interview, 16 April). Karolinska Development is now the main owner of Athera Biotechnologies AB, and has included the company in their innovation product portfolio⁹

In addition Athera Biotechnologies AB and Karolinska Institute are co-leaders of the CVDIMMUNE consortium, which combines academic and industrial expertise and objectives. One of the main goals of the consortium for example is to investigate novel risk markers for CVD. The project involves leading European academic and industrial partners (Athera Biotechnologies AB).

The company has both academic and industrial partners. Some examples of academic partnership are: Uppsala University, University of Mainz (Germany), and Imperial College, England. Information about industrial partners is kept confidential. The main customers of Athera are science professionals such as doctors and nurses and their main goal is to help patients (H. Grönlund 2008, interview, 16 April).

1.3 Motivation

Our motivation has mainly developed from an interest in the fact that Pharmaceutical industry is one of the fastest growing industries within Sweden. Sweden is accounted as Europe's most innovative region despite the low number of populations of 9 millions people¹⁰. This conveys that Sweden might be, as itself, an innovative country for SME and MNC to create their competitive strategy. It is also known that Academic Institutions as well as Industry cooperation has been fundamental to the growth of Swedish life science industry. Since there has been a rapid increasing in numbers of SME biotechnology companies in Sweden recently, this kind of collaboration between academia and industry might be able to explain how these SME are able to compete with MNCs.

The long period and the complex process of drugs discovery are some of the reasons for the high investments in pharmaceutical industry, which in turn can only be covered if the company receives a patent for its innovation. Some drugs fail part-way and receives no revenue in return, some are successful; however, the patent clock is ticking. As we know that this industry within Sweden is the largest innovation utilized, strong collaboration among academic and industry networks including interest on these issues motivates us to find out how the SME could survive within this pressuring condition.

⁸ Karolinska Innovations AB, http://www.karolinskainnovations.ki.se/about/index_en.html

⁹ Karolinska Development, http://www.karolinskadevelopment.se/index.php?option=com_content&task=view&id=15&Itemid=30

¹⁰ Invest in Sweden Agency, August 2007, http://www.isa.se/upload/english/Publications/BiotechTools_pdf.pdf

1.4 Strategic Question

Fisher (2005) clarifies that strategic questions differ from research questions in a way that they can not be answered fully by the thesis project. They are very important in the beginning of the research project because they show the motivation of the researchers (Fisher 2005). Our main motivation was to see how SME pharmaceutical company fosters innovation in order to compete with the existing MNCs pharmaceutical company within Sweden. We are not aiming to answer this question in our thesis; instead we want to contribute to the research that has been done in this area. We will do this by examining one SME and one MNC company and hopefully by the end of the project we will be able to contribute towards the big picture in pharmaceutical industry.

1.5 Research Question

- How is organizational innovation being promoted, developed, and sustained within Athera Biotechnologies AB and AstraZeneca?
- What is Athera Biotechnologies and AstraZeneca business strategy for development of networks relationships?

1.6 Research Purpose

Our main purpose is to describe how organizational innovation is promoted, developed and sustained in one SME - Athera Biotechnologies AB and one MNC- AstraZeneca. To make this study relevant since the two companies are so different in size, we will examine only one part of AstraZeneca, in particular the R&D. The reason why we chose the R&D department of AstraZeneca and not any other is because Athera is only Research and Development Company and by choosing AstraZeneca's R&D department it will be easier to look for differences and similarities between the two companies. We will examine both external and internal factors that influence business strategies of both the SME and the MNC. It will be interesting to compare two pharmaceutical Swedish companies and see the differences and similarities in the way they foster the process of organizational innovation.

1.7 Delimitations

Our study applies only to two Swedish companies – AstraZeneca and Athera Biotechnology AB and their strategies for developing, maintaining and enhancing organizational innovation. We have examined how government and highly qualified and educated individuals affect their organizational innovation and how the two companies develop networks and partnerships. Especially important are the relationships with Academic Institutions. Still we argue in our analyses that Sweden is an innovative country where there are a lot of highly educated people in the pharmaceutical and biotechnological industry. In other countries and regions a problem may arise of how to access such a qualified pool of scientists. In contrary to many other countries, Sweden also provides a directive law protecting academia scientists' discovery in term of intellectual property. Our research will not examine these problems. Many important factors in this industry such as patents and government regulations are outside the scope of this study. We have also not looked into the internationalization process of the companies and their status in comparison with companies from other countries. When it comes to innovation, we do not follow a direction of technological innovation but instead we look into the process of organization innovation and

how it can enhance drug development process to be able to pursue technological innovations in this industry. Another limitation in our study is that we compare only one department of AstraZeneca with Athera due to the difference in size of the two companies. Since Athera is only Research and Development Company it will be best suitable for our research to compare it with Research and Development department of AstraZeneca and not any other.

1.8 Target Group

The investigation is directed toward Entrepreneur, Bio-entrepreneur and those who has interest in entering Pharmaceutical and Biological Industry. Also for people who are interested in the topic of entrepreneurship and innovation within these industries. It is also aimed towards students and academic researchers.

2. Research Design

2.1 Problem Structure and Research Process

There are three main types of research designs. Firstly, 'Exploratory research' is used when the research problem is not well understood and the problem is unstructured. Secondly, 'Descriptive research' is used when the problem is structured and well understood by procedures and precise rules. Lastly, 'Causal research' is used when the problem is well structured with cause and effect type (Ghauri & Gronhaug, 2002, p.48). In our case study, we find that the exploratory type is the closest to our research design since we need to explore findings of our research questions in a process of sequences, in another word, once the collecting data leads to new information, and the picture becomes clearer by each finding sequence.

The purpose of the research process is to show the different stages of development of our thesis project. Initially as one of our group members had always been interested in pharmaceutical industry together with our curiosity in innovation and entrepreneurship processes we came up with our topic and began rough planning of our research timeline. In the 2nd stage we came up with our literature review by searching for different relevant theories such as Entrepreneurship, Corporate Culture and etc... from our previous course literature, books, journals and articles. During the search we expected to find theories that will help to answer our research problems. In this stage we also formulated our research questions as well as research purpose, which in turn gave us direction for solving our research problem. We had a tough time finding which theory would be most relevant to our case study. Therefore, we drew two different diagrams for each company to describe our conceptual framework. After building a conceptual framework in the 3rd stage, the concepts and key theories that we have selected earlier became clearer. Nevertheless we had to discard some of the theories from the previous stage. Then we selected what we thought were the best suitable methods for our case study. This 4th stage also involved choosing which methodological approach, research method and strategy to carry out. This particular stage consumed quite amount of time in our thesis process due to difficulties in finding the right company and the right person to conduct an interview with. We faced some difficulties at the beginning due to the limited time we had; however we finally managed to find the most relevant contacts. After we collected relevant data for both companies we analyzed it by using the key theories we have chosen in stage 2 together with few additional theories. In the 5th stage we also brainstormed and used our research design as a guideline to interpret the data. The answer to the research questions at this stage became clear and comprehensive. In the mean time, we also made some adjustment to our designed conceptual framework when necessary to align the result with the literature

review. We came to conclusion and implication in our study at this point. Finally the last stage in our thesis was to structure the gathered information, data, and ideas and write up the thesis. It did not take us long time to organize our paper since we only examined two companies. We focused mainly on the content, not the length of the thesis work. Therefore, it was quite easy for us to arrange topics, headings, data, and analyze in proper sequence. This stage was also a very important stage because we think that in order to have a perfect thesis paper, language as well as the flow of the paper must be easy follow. To make it easier for the reader we also strictly followed Harvard system when writing citations and references. Figure (1) below is showing the five stages process of our paper.

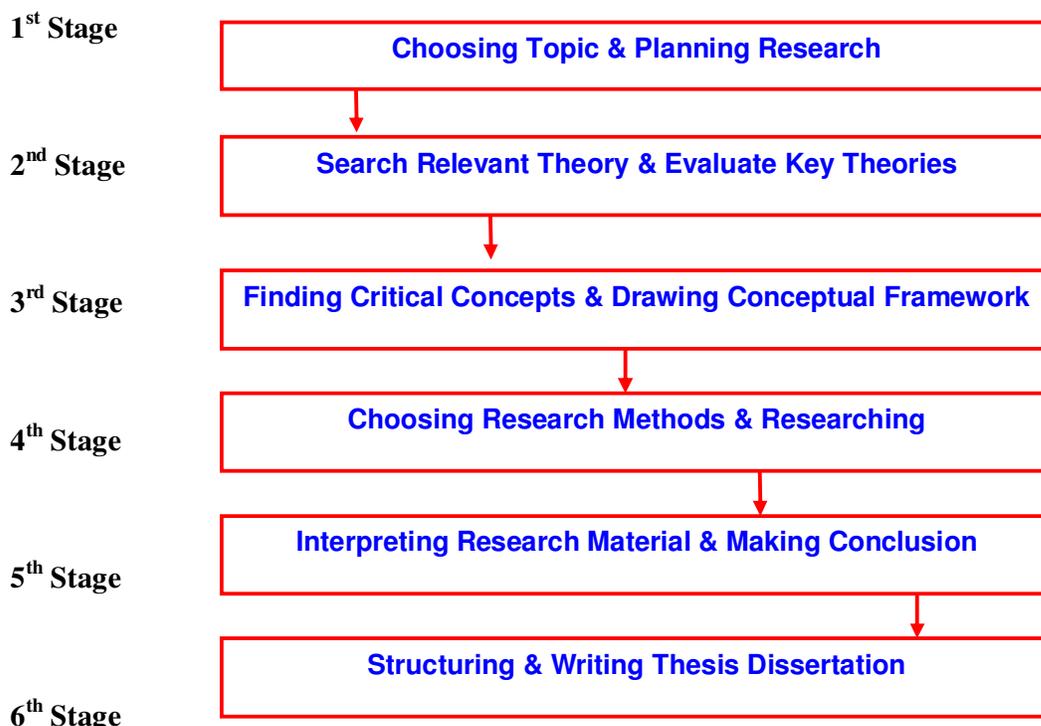


Figure [1] Research Process Stages (Source: our own)

2.2 Research Approach

2.2.1 Induction or Deduction

Once we have chosen the main concepts and theories of our project we will analyze them. Since it is hard to distinguish a valuable argument when we are reviewing a large amount of literature we will use three different criteria to help us recognize a valid argument. These components are premises, inference words, and conclusion (Fisher, 2005, p.74). “Premises” are assumptions whether something is true or a fact. “Conclusion” is an arguable statement. “Inference words” are indicators that the author is about to draw a logical conclusion, example of such words are: ‘thus’, ‘therefore’, ‘because’ and ‘implies’ (Fisher,

2005, p. 75). It is possible, based on the above mentioned components to identify the main argument presented in a book or article.

Deduction is a process in which conclusion is drawn from logical reasoning from the stated premises (Fisher, 2005, p.75). This means that deduction is not dependent on observation and experience but only on logic and it follows an inference word or phrase which means that there is no doubt about the credibility of the conclusion (Fisher, 2005, p.75). Induction on the other hand is when the conclusion is drawn from past experience or experimentation and the conclusion is made based on the assumption that things have always been this way and because of that will continue to be in the same way in the future (Fisher, 2005, p.75). Deductive conclusions are certainties while inductive conclusions are probabilities.

We obtain facts through observation which leads us to theories and law (Induction) represents the first step of scientific scheme. On the other hand, once we have ideas and facts, this lead us to explanations and predictions (Deduction) to confirm or disprove these theories and hypothesis (Ghuri & Gronhaug, 2002, p.13) as explained in diagram Figure 2 below:

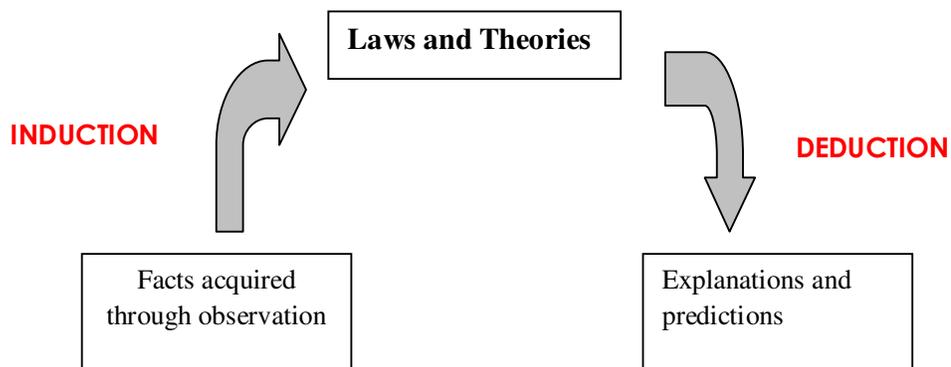


Figure [2] Inductions and Deduction (Source: Ghauri & Gronhaug, 2002, p.14)

Most scholars and researchers believe that they have been using both of these methods in their research (Ghuri & Gronhaug, 2002, p.14). This also apply in our case and we can say that best suited for our purpose is both deduction and induction method since we are going to base our research on already existing theories and try to draw conclusions from already known facts as well as from empirical data from the interview.

2.3 Research Strategy

There are several different ways of doing research in business and social science. For example research can be done by experiment, histories, the analysis of archival information and a case study (Yin, 2003, p.1). All this strategies according to Yin have their advantages and disadvantages in relation with 1) the research question, 2) the extent of control the investigator has over the research and 3) if the research is concentrated on contemporary or historical phenomena. For example case study is used as a research strategy when the researcher is trying to answer questions such as “why” and “how”, he/she has only small

control over the events in their research and finally the investigator is focusing on a current problem (Yin, 2003, p.1). Another reason for using case study as a research strategy is to increase our knowledge in particular individuals, groups or organizations of interest (Yin, 2003, p.1). Since our project will focus on examining two organizations and our research question consist of how these organizations develop, maintain and foster innovation we think that a case study will be the most appropriate research strategy.

2.4 Methodological Approach and Research Methods

Research Methodology is the science of studying how a research is to be carried out, or more specifically tries to understand how different procedures relate to different phenomena (Chinnathambi, Philominathan & Rajasekar, 2006, p.2). It also looks into the different procedures, by which researchers describe and explain different phenomena in their research. Research Methods on the other hand are used to help the researcher to find solutions to particular problem by collecting samples, data and different kind of information (Chinnathambi et al., 2006, p.2).

2.4.1 Methodological Approach

There are many different methodological perspectives that a researcher can use for their thesis project. One approach is the Realist research. This kind of research looks for relationship between different variables and tries to find chains of cause and effect. According to Fisher (2005, p.35) this kind of research is based on separating a problem into its “constituent parts” and studying the relationship between these parts. Realist researcher will then try to find patterns among these relationships and used them to create “principles and laws” which can be used as possible solution for a particular problem (Fisher, 2005, p.35). Interpretive research is another useful approach where the researcher tries to find how people make sense of the world around them and the “structures and processes within it” (Fisher, 2005, p. 41). It is an endeavor to generalize about how meaning is developed through interaction between humans. The realist will form structures from variables and will examine the connection between cause and effect relationships, while the interpretivist will form structures from interpretations and study how people develop ideas through conversations and debates with other people and with themselves (Fisher 2005, p.41).

The approach that we decided to use is an interpretative approach. It will be better suited for our purposes than a realists’ approach since we are not going to look into cause and effect relationships. This type of research will help us to see the link between collaborators and organizational action as an indirect one since people can make sense of the world differently. With this approach, we expect to be able to explore our research question - to compare the organizational innovation strategy and network relationship development between two different companies.

2.4.2 Research Methods

Primary data is used depending on the research problem and research design in which secondary data is not able to answer. Advantage of primary data is that it is more consistent in case that we want to know about people’s attitudes and intentions for a particular product. Through primary data, we can understand the management decision and problem faced as well as the opinions and behavior. However, the main disadvantage of this type of data collection is that it takes a longer time and it is difficult to get access to as well as it has less degree of control. There are many methods for this type of data collection such as experiment, observations, communication, surveys and interview (Ghauri & Gronhaug, 2002, p.81).

When deciding to collect a data through a primary source, researcher also needs to decide if he or she wants to use a qualitative or a quantitative data collection and analysis method. This depends on the overall decision on which type of data is appropriate for a particular research problem. The main difference between the two research methods is their procedure. “A qualitative research is a mixture of the rational, explorative and intuitive, where the skills and experience of the research play an important role in the analysis of data” (Ghauri & Gronhaug, 2002, p.86). Qualitative research is common in social and behavioral sciences and it is suitable for examining organizations, groups and individuals (Ghauri & Gronhaug, 2002, p.87). There are three different kinds of data collection that can come out of qualitative research: “in-depth open interviews, direct observation and written documents” (Patton, 2002 p.4). Interviews give the researcher direct statements from people about their practice, beliefs, feelings and knowledge. Data from observations on the other hand comes from detailed description of people’s “activities, behavior, actions and their interpersonal interactions and the organizational process” (Patton 2002, p. 4). Written documents examination includes the studying of quotations or whole passages from organizational records; “company’s official correspondence; publications and reports; personal diaries and open-ended responses to questionnaires and surveys” (Patton 2002, p. 4). Quantitative research on the other hand is based on the measurement of quantity or amount. The process in this kind of research is described in terms of one or more quantities (Chinnathambi, Philominathan & Rajasekar, 2006, p.4).

An advantage of the quantitative method is that it can measure the response of a large population with limited questions and at the same time give a statistical evaluation of the data. This in turn will give the researcher more broad and generalizable findings. Qualitative research by contrast gives very rich and detailed information about much smaller group of people, which increases the investigators understanding of the research problem or study case. For our case study we have chosen qualitative research method, because we will not study large groups of people or organizations, but we will examine and try to understand two companies, which corresponds with the definition of qualitative methods of Ghauri & Gronhaug (2002).

The method of data collection is different from technique. Method refers to what to do and why to do it while technique refers to how to do it. In research there are 3 types of interview techniques, 1) structured interview, 2) unstructured interview and 3) semi-structured interview. Structured interview uses a standard format of an interview and expects a fix response while unstructured interview gives the respondent quite a liberty to react, to give opinion on a particular topic. This type of interview often brings in a new discovery to answer the research questions. Semi-structured interview or open questions allow the respondent to feel free to talk extensively rather than in a trained response (Fisher, 2005, p.143).

A secondary data can provide much more relevant information than researchers can expect. With the help of secondary data, researcher is able to answer research questions, problem formulation and selecting best research method. Advantages of this type of data are such as saving time and money when acquiring the data and reliability of the information. It is also considered appropriate to begin with secondary data and then, only when it is not enough information, to proceed on with primary data. However, the disadvantage of secondary data is that these data is collected for different objectives and sometimes can not fit into the research questions perfectly. The sources of information are separated into internal and external sources. Internal sources are such as information on customer, suppliers, competitors, and etc.

while external sources are such as published books, journal articles and etc (Ghauri & Gronhaug 2002, p.80).

There are three methods of interview: personal interview, interview by mail and interview by phone. In our case study on Athera, we choose to collect primary data through the method of personal interview. From this method, we expected to gain the interviewee's perspective as well as own opinion on innovation process and network development within the pharmaceutical industry. We also believe that this method is the most suitable for our case since the company has a limited secondary data available. We choose to conduct a personal interview because we intend to observe the interviewee's full expression and behavior when answering complicated matters as well as sensitive issues. We had conducted an interview with Dr. Hans Grönlund', Vice President of Diagnostics in Athera Biotechnologies (Appendix A). Reason for choosing Dr. Grönlund is because he has experience in both academic and business area. He represents a bio-entrepreneur who is knowledgeable of the product as much as knowing how to bring it into the market. We expected to receive in-dept knowledge as well as to discover hidden issues relating to our case study based on his strong science background and his management experiences within this industry. The interview took place at Karolinska Institute, building L2/04 in Stockholm. Interview date was on April 16, 08 between 16:30-17:30 pm. The technique used was semi-structured with 10 open questions (Appendix B) and it was not recorded which gave the respondent opportunity to feel more relaxed and open when giving detail opinions. The respondent was free to answer from their own thinking (Ghauri & Gronhaug, 2002, p.101). We have chosen this particular method due to several limitations in other methods of data collection. The reason we did not use questionnaires is because we had no access to statistical database and we did not use observations and panels as well because of the difficulties to get in contact with relevant respondent from the company. Furthermore, if additional primary data is necessary, we plan to also acquire additional questions through email. Finally, we will use secondary data obtained from company's web site as well.

For our case study of AstraZeneca, we decided to collect secondary data because a rich variety of sources was available and there was no critical need for acquiring primary data. We carefully choose only reliable sources which are published and approved with authorized parties. The secondary data was obtained mainly from internal sources such as corporate sites and press releases. In order to obtain additional information, we accessed external sources such as journals and publications.

Furthermore, we also obtained primary data through a telephone interview with Dr. Carl J. Sundberg (See Appendix A) who is an associate professor as well as a lecturer from Karolinska Institute, unit of Bio-entrepreneurship (UBE). The reason for choosing to conduct interview with him was mainly due to his profession. UBE is a department within KI which focuses on new field of expertise in combining discoveries in health science, medicine and technology with innovation process in business context.¹¹ We anticipated gaining valuable information from him to support our case analysis. In this case, we choose to conduct a telephone interview option following the interviewee's preference.

¹¹ Karolinska Institute, <http://ki.se/ki/jsp/polopoly.jsp?d=11072&a=43916&cid=11074&l=en>

3. Literature Review

When it comes to literature review, we decided to investigate a group of theories in connection with factors (internal and external) that have influence over a company's organizational innovation. First we will show different definitions of the concept "innovation" and which one of all we have adopted for our thesis research. Then we are going to use resources based theory to explain that people are essential asset when it comes to managing successful innovation. We will investigate two main areas: entrepreneurship, and network & partnership in relation to a rich number of articles that refer to the same theories relating to innovation.

We will look at networking and partnership to examine how it influences innovation in pharmaceutical companies. As we already realized that high technology companies must be part of the global knowledge network if they are to remain competitive. They do this by undergo merging, acquisitions and strategic partnerships. Through the investigation of our cases, we might be able to find out how innovation in this industry results from networks of agents, in this case is relationship with biotechnology companies, drug developing companies, universities, academic researchers and other health related institutions Also we will take a closer look at some of the theories about Entrepreneurship, Entrepreneurial Culture and Corporate culture.

3.1 The Concept of Innovation

There are many definitions when it comes to the concept "innovation". According to Van de Ven (1986, p. 591) an innovation is "a new idea, which may be a recombination of old ideas, a scheme that challenges the present order, a formula, or a unique approach which is perceived as a new by the individuals involved". A similar description is also presented in the entrepreneurship definition by Ireland (cited in Garcia-Morales, Llorens- Montes, Verdu´-Jover , 2006, p.22), who says that entrepreneurship consists of "creating new resources or combining existing resources in new ways in order to develop and commercialize new products, move into new markets, and/or service new customers". Drucker (1985, p.8) portrays knowledge – based innovation, being scientific, technological or social as the "superstars of entrepreneurship" among all other types of innovations. This kind of innovation retrieves the most "publicity" and profit and it is most of the time what people "mean" when they think or talk about innovation (Drucker 1985, p.8). Further on he characterizes innovation as "the means by which the entrepreneur creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth". In many articles and publications and as noticed above, one can see that the terms "innovation" and entrepreneurship" can be used complementary without changing the context of the work (Garcia-Morales, Llorens- Montes, Verdu´-Jover, 2006, p.22). Science- based innovation is another kind of innovation that can be characterized with the ability of researchers to provide solutions for biomedical problem. More specifically innovation is the discovery of the best possible "fit between the favored problem and its suggested solution" (Styhre, 2005 p.302).

Another concept of innovation is organizational innovation, which is defined as a key factor of an entrepreneurial orientation. It is the process of "proposing, adopting, developing, implementing a new idea in relation to a product, process, policy, practice, behavior, program, service which is generated from inside or outside" (McAdam and Galloway, 2005 cited in Garcia- Morales, Llorens-Montes, Verdu´-Jover, p. 22). An invention can not become an innovation without support from transformed organization, in this case, organizational

innovation. In our thesis project we will focus on factors that affect the process of organizational innovation in Athera and AstraZeneca.

3.2 Resource Based Theory

Penrose defines the internal resources of the organization as “the productive services available to a firm from its own resources, particularly the productive services available from management with experience within the firm” (Penrose 1995, p.5). Further on she describes the firm as “a collection of productive resources the disposal of which between uses and over time is determined by administrative decision – the physical resources of the firm consist of tangible things – there are also human resources available in a firm” or more importantly “it is never resources themselves that are the inputs in productive process, but only the services they render” (Penrose 1995, p.24). For her the company is a “collection of both human and material productive resources” (Penrose 1995, p. 320).

3.3 Network and Partnership

Traditionally the Pharmaceutical industry has been classified as having a significant organic growth based on patents, intellectual property, technologies and marketing capabilities (Coombs & Metcalfe 2002, cited in Bessant, Gupta & Smart 2007, p. 1070). The companies in this specific industry rely on external expertise from biotechnological innovations and in recent years this has forced them to unite, reconfigure, incorporate and coordinate resources within a “distributed innovation network” (Coombs & Metcalfe 2002, cited in Bessant, Gupta & Smart 2007, p.1070). In order to get access to this external knowledge resources, which in turn leads to the creation of novel products, companies enter into innovation networks. Further more the development of a novel biotechnological product depends highly on the complimentary resources which are shared by organizations that constitute innovation networks (Bessant, Gupta & Smart 2007). These networks can consist of “universities, small biotechnological companies, clinical research organizations (CRO), and pharmaceutical companies; research laboratories and independent financial providers” (Bessant, Gupta & Smart 2007, p.1070). This specific pooling of resources has been previously described in the high-tech industry by Håkansson (1987 cited in Bessant, Gupta & Smart 2007) and it is known as the network approach. The network approach emphasizes more on how the focal firm together with other firms in a network continually changes the context through their interaction. According to this model it is not only possible for an organization to access some of the resources of the network they belong to through direct relationship or partnership with another firm, but also to benefit from accessing resources through a third party involvement (Bower, 1993).

Burt on the other hand emphasizes on the importance of benefit-rich networks and the vital role of trust in a network. For him it is critical for an organization entering into relationship to know who to trust. This is because competition is never perfect and you can not trust the system to provide a fair return on your investments, like it will be the case of a perfect competition. In the imperfect competitive world you can only trust your “personal contacts” (Burt, cited in Swedberg 2000, p. 288). The author also makes distinction between sparse and dense networks. The contacts in a sparse network are not in the same social circle and they do not have strong relationship, while the dense network consists of contacts with strong relationship. Sparse network can be more information beneficial, while dense is inefficient in the way that it returns less diverse information for the same effort as the sparse one. This is because the people in a dense network know what the other contacts know. Burt (cited in Swedberg, 2000) also defines the term structural hole, which is the relationship of non-

redundancy between two contacts in a sparse network. Non-redundancy refers to when two contacts do not know each other. The structural hole plays a role as a “buffer” between the contacts and is more beneficial because the contacts do not know each other and in that way provide not overlapping information (Burt cited in Swedberg 2000, p.291).

Another similar definition of networks and their importance we can see in chapter three from Burns’ “Entrepreneur Spiderman”, where the focus is on network within and across organizations. The author defines that the core of entrepreneurial approach of doing business is the development of relationships with customers, staff, suppliers and all the stakeholders in the business. These relationships are based essentially on trust and respect. Further more he describes that credibility is very important part of building networks and partnerships. If it is a start-up company it can be based on the educational background of the founders. Another key aspect for creating strong networks is personal contact and “relationship marketing” (Burns 2005, p.44).

Partnership is an important component of Networking. According to Veludo, Macbeth and Purchase (2004, p.145) the “dimensions” considered within the partnership framework are, such as, “trust, long-term orientation, co-ordination, problem solving and flexibility”. The distinctiveness of partnership, connected to those dimensions consist of “inherent trust, sharing of risks and rewards, increase in joint competitiveness, supplier development, joint planning, two-way communication, willingness to help one another” (Veludo, Macbeth and Purchase 2004, p.145). The authors further assert that partnership is a “relationship type” that has to be identified and targeted, by the partners involved, at the beginning of the learning process leading to previously agreed objectives (Veludo, Macbeth and Purchase 2004, p.145).

3.4 Entrepreneurship

There are many definitions written in scientific articles and books about Entrepreneurship. Schumpeter was the main figure to influence the literature about entrepreneurship. In chapter 2 of his book “The Theory of Economic Development” he describes entrepreneurship as the creation of “new combinations” through already existing goods and materials (cited in Swedberg 2000, p. 15). For him everyone is an entrepreneur as long as it “carries the new combinations” (Swedberg 2000, p. 60). He makes clear distinction between entrepreneur and capitalist, describing the latter as only “owners of money” and “material goods” (cited in Swedberg 2000, p. 58). Further on he explains that just because you invent something it does not make you an entrepreneur. You need to bring it to the market and be innovative. He does not talk about entrepreneurship through imitation as other scholars do. In the same chapter of his book, Schumpeter describes five typologies of entrepreneurship; three of which are prominent because they concern the behavior of the entrepreneur. These are as follows: “the introduction of new good”; “the introduction of new method of production”, “the opening of a new market”; “the conquest of new source of supply of raw material”; and the “creation of new organization of an industry” (cited in Swedberg 2000, p.15). At the same time he also explains that what motivates the entrepreneur is not money “per se” but it is “the dream and the will to found a private kingdom”, “the will to concur” and “the joy of creating” (cited in Swedberg 2000, p.16).

Another view on entrepreneurship we can find in the work of Burns (2005). Innovation and Entrepreneurship are at the heart of success for individual firms and also of national advantage, according to Burns (2005). The author describes innovation as a “mould breaking: development of new products and services. In particular how they are produced, what kind of

materials are used and what kind of processes are employed or how is the company organized to deliver them to the market (Burns 2005, p.247) Further on he emphasizes that the key for successful corporate entrepreneurship is in the ability to innovate. What the author means by corporate entrepreneurship is the entrepreneurship that links ideas to commercial opportunities and offers effective business model with good management.

We are going to look into another author's view on corporate entrepreneurship as well. In his article, "When a Thousand Flowers Bloom: Structural, Collective, and Social Conditions for Innovation in Organization", Kanter (cited in Swedberg 2000, p.31) refers that innovations within firms can be cultivated with excellent results. The main idea behind this corporate entrepreneurship focuses on how to create a corporate environment that is positive to the generation of ideas, then put the resources into idea generators and have an organizational structure that facilitates the completion of the new project and helps diffuse the innovation. We will use this article to back up our research question that innovation consists of a set of processes carried out at both micro-level by individuals and groups of individuals and in turn stimulated, facilitated, and enhanced by the macro-structural conditions.

3.4.1 Entrepreneurial Culture

In the discussion of Entrepreneurship, culture is important because it determines "the attitudes of individuals towards the initiation of entrepreneurship" (Vernon-Wortzel and Wortzel, 1997 cited in Morrison 2000, p.62). Culture has been described also by using terms such as "innovative, holistic, risk-taking and coordinating ways of behavior" (Vernon-Wortzel et al., 2000). The term entrepreneurial culture is described by Morrison (2000) as the attitude towards commerce at the business level. The author continues with the statement that what influences entrepreneurial culture the most is the present business environment of a country (Morrison, 2000, p.62). A major factor in promoting entrepreneurship in a particular society plays the government. A culture that prizes entrepreneurship can be seen in the generous support for pure and applied science from the government as well as the making of favorable policies which enables schools and universities to produce highly educated individuals (Timmons, 1994 cited in Morrison, 2000).

3.4.2 Corporate Culture

It is mentioned in the article by Sadri & Lees (2001) that corporate culture is no longer just a competitive advantage of a firm, but has become a requirement for success and especially to attract and retain top management personnel. "Corporate culture is composed of attitudes, values, behavioral norms, expectations and the pattern of arrangement, material or behavior which has been adopted by a society as the accepted way of solving problems" (Sadri & Lees, 2001, p. 844). A positive corporate culture is what boosts the work environment within the organization. It consist of; firstly, not only a mission statement but company's corporate vision; secondly, supported by corporate values that consistent with company purpose and personal value of employees and; thirdly, all employees are highly involved within the organization as team members (Sadri & Lees, 2001, p. 845).

Maanen (2005, p.255) on the other hand reviews a "corporate culture" as a way of indicating a sort of culture of cultures in the analysis of MNC. Many researchers suggested that culture operates as a bonding device holding an organization together – the superglue that connects structural elements of a firm to its economic, political, and social strategies, and ultimately to the results it obtains from the marketplace (Ott, 1988; Czarniawska-Joerges, 1992; Martin, 2002; cited in Maanen 2005, p.256). He also makes a distinction between strong and weak

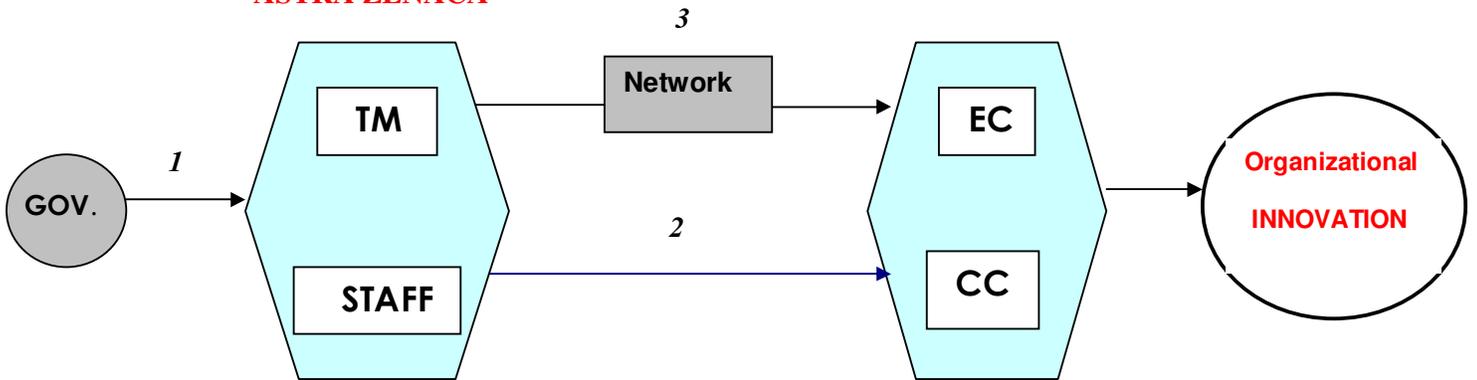
corporate culture when it comes to MNCs. A company with strong corporate culture is expressed by having similar management and organizational routines through the whole company; the limitation in a way of subsidiary judgment and having certain control over all units that comprise the company. On the other hand weak corporate culture is the opposite of strong corporate culture (Maanen, 2005, p.292). In other words a company with strong corporate culture makes sure that the company's mission and core values are followed by each and every employee regardless of whether it belongs to subsidiary or main headquarters. Staff and top management identify themselves with the company's goals and direction.

3.5 Literature Review Summary

When comes to examining organizational innovation and networks development in both companies we are going to use some common and some different theories from our literature review. In both companies we will use Morrison's theory of entrepreneurial culture, which is according to her the attitude towards commercialization of novel products. This is in accordance to Schumpeter, who states that you need to bring the product to the market in order to be entrepreneurial. The importance of government in the process of promoting highly educated individuals which is expressed by Morrison will be applied when analyzing both companies as well as Penrose's resource based theory which emphasizes on how vital human capital is in the firm. Another similar theory we will use in our analyses for both companies is Maanen's (2005) definition of corporate culture which describes it as the unity that holds the company together and we will also examine the importance of positive corporate culture (Sadri and Lees, 2001). The mentioned above theories of entrepreneurial culture and corporate culture will help us to describe how the two companies develop and maintain organizational innovation. In addition Burt's theory about personal networks based on trust and Veludo's partnership characteristics which are also based on trust will describe how Athera is creating its strategic networks and at the same time is being able to develop and maintain the company's organizational innovation. In AstraZeneca on the other hand Bessant (ibid) network theory which is based on innovation networks and Håkansson's (ibid) network model will help to show how the company is enhancing its organizational innovation through access to novel technologies from participation in innovation networks and benefits from indirect third party relationships which in turn leads to novel products. In addition we will use Veludo's (et al. 2004) theory that among the important characteristics of partnership is joint strategy, continuous will to improvement and sharing or risk and awards. In conclusion the main theories will use in order to examine both companies are entrepreneurial culture, corporate culture and networks and partnerships.

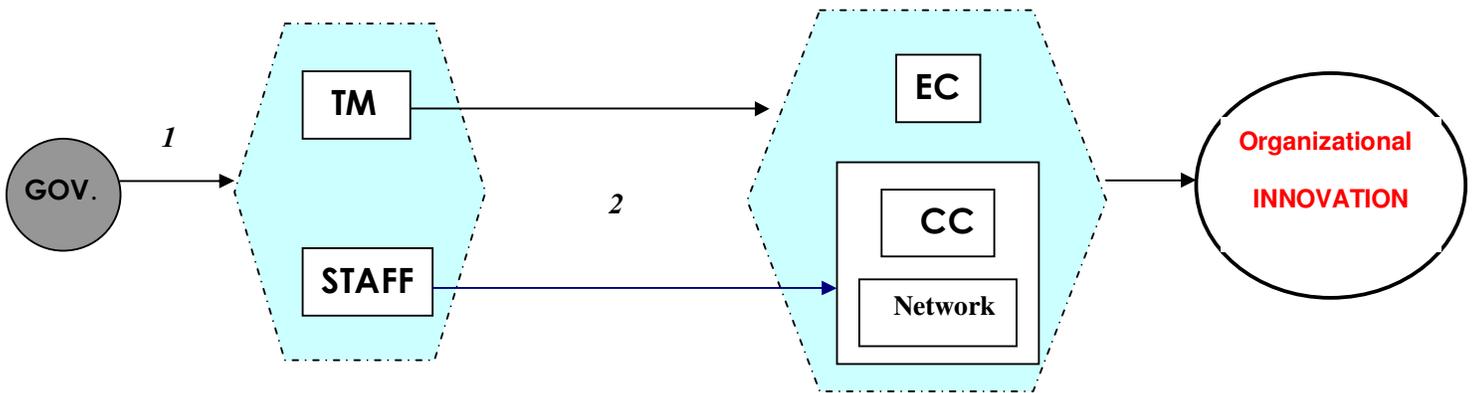
4. Theoretical Framework

ASTRA ZENACA



Model A

ATHERA



Model B

1st Stage: Promoting

2nd Stage: Developing & Maintaining

3rd Stage: Enhancing

Blue: Internal Force

Gray: External Force

Figure [3] Organizational Innovation Process (Source: our own)

4.1 Sequences of conceptual framework

We are going to present a framework which will explain the innovation processes using conceptual tools such as: entrepreneurial culture, corporate culture and networks and partnerships theories. This framework describes three stages of the two companies and how each strategic tool is involved in the developing, maintaining and enhancing of organizational innovation: (1) Promoting Stage, (2) Developing & Maintaining Stage and (3) Enhancing Stage. There are two different models that best described the two companies: AstraZeneca (Model A) and Athera (Model B) the reason why we decided to have the two models is due to slight differences in theories that explain the process of Organization Innovation in the two companies. We were inspired to create our framework after we read the article by Garcia-Morales (et al.), and his description of organizational innovation as the process of promoting, adopting, maintaining and implementing new idea in relation to a product or process. This definition fits our research and we decided to use it as a main concept when we discuss organizational innovation through our paper. The above models of our framework are our creation and at the same time they help us to answer our research question of how organizational innovation is being promoted, developed and sustain in both companies.

The three main theories which we will use as tools to describe this process are Network & Partnership, Entrepreneurial Culture (EC) and Corporate Culture (CC). The blue highlighted boxes represent the internal resources which in our case are top management (TM) and employees (Staff), and the internal forces that develop and maintain organizational innovation, which in the case of the companies are Entrepreneurial Culture (EC), Corporate Culture (CC), and in particularly for the case of Athera: Networking. The grey smaller boxes on the other hand represent the external forces which influence the process of organizational innovation, in our case: Government for both companies and Networks for AstraZeneca. The distinction between top management and employees was needed since they affect differently the process of maintaining and developing of organizational innovation in the two companies.

4.2 Process of Organizational Innovation

1st Promoting Stage – We will use Morrison's (2000) idea that the strongest influence over EC is the current business environment within the country and an important factor fostering entrepreneurship is played by government in a way of creating support for science and academic institutions to produce educated individuals. These highly educated individuals are portrayed in by Top Management (TM) and company employees (Staff) in our diagrams. The TM and Staff are important part of the two companies' internal resources. Penrose's (1995) resource based theory will be used to support our statement that highly qualified and educated people are of importance when it comes to organizational innovation.

2nd Developing and Maintaining stage – Once there is a pool of skilled individuals, who come up with an innovative idea, this particular idea needs to be commercialized in order to become successful innovation. In order to describe this phenomenon in both companies we will use the help of the theory of Entrepreneurial Culture which is defined by Morrison (2000) as the attitude towards commerce in the business level. Schumpeter (cited in Swedberg, 2000) also describes entrepreneur as someone who brings the idea into the market According to him it is not enough to have an innovative idea, you need also to commercialize it. Another important tool in examining AstraZeneca and Athera is corporate culture, which is defined as the superglue that connects employees at all levels who work towards the same goals (Maanen, 2005). In particular to a big company like AstraZeneca, with the help of this tool, we will describe the importance of creating entrepreneurial environment with positive employees

(Sadri & Lees 2001). Kanter's (cited in Swedberg 2000, p.31) view on corporate entrepreneurship adds the importance of creating positive environment for the generation of good ideas. Through this processes of creating entrepreneurial and corporate culture the companies are able to continue to develop and sustain organizational innovation.

When it comes to Networks our model becomes different for both companies. In the case of Athera, we will use Burt's (cited in Swedberg, 2000) theory to see the importance of personal networks and trust which is also described as one of the important characteristic of partnership according to Veludo, Macbeth and Purchase (2004). We will also include Burns' theory of business relationships within and across the organization based on trust and respect to support the building of network and partnerships within Athera (Burns 2005, p.44). The above theories about personal networking and trust will help us explain how Athera develop and sustain organizational innovation. In Athera, network and partnership are used more in the form of strategic alliances with academia and suppliers. On the other hand, Network Theories are not going to be included in the 2nd stage of developing and maintaining of organizational innovation in the case of AstraZeneca, but are going to be a part of the enhancing of the process of innovation.

3rd Enhancing Stage –In the case of AstraZeneca we will use the theory of network approach by Bessant, Gupta & Smart (2007) to examine how the company gets access through their networks to “cutting edge technologies”, which in turn leads to the creation of new products and at the same time enhances organizational innovation. Håkansson's Network theory is going to contribute to the explanation of how AstraZeneca is getting access to knowledge resources through indirect relationships inside innovation networks. The aspect of partnership as strategic alliances, mergers and acquisitions will be also describes as vital component of networks

5. Analysis and discussion

When looking at our case study, we identify that the actual process of Organization Innovation of the two companies, AstraZeneca and Athera as shown in figure 4.1, have started from a common force (external force) established by the government.

Nicholar J. Simon, Managing Director of Clarus Ventures has mentioned that “Sweden has created an excellent environment to cultivate new companies in pursuit of innovative products that better diagnose and treat significant unmet medical needs. There is a rich history in life science – Sweden's academic institutions have fostered some of the very early and basic discoveries in life sciences and emerging biopharmaceutical and diagnostic companies have grown into global players”¹² This indicates that Sweden as an innovative country itself has been fostering resources to become one of the world's experts in this field. Swedish government support for education at all levels including grants and scholarships for researcher and students¹³ have been a foundation to produce educated population within this country. This is in according to Morrison (2000) that support from government as well as the making

¹² Pharmaceuticals & Biotechnology, Invest in Sweden Agency, August 2007, http://www.sweden.se/templates/cs/FactSheet_17268.aspx

¹³ Pharmaceuticals & Biotechnology, Invest in Sweden Agency, August 2007, http://www.sweden.se/templates/cs/FactSheet_17268.aspx

of favorable policies enables schools and universities to produce highly educated individuals, in this case, top managements and staff within the organization. Sundberg mentioned that many companies in this industry fail because they can not recruit people with enough experience and knowledge within the area where the company is located (C. Sundberg 2008, interview, 28 April). Sweden has been classified as a country with high concentration of qualified labor in the area of pharmaceutical and biotechnology. The southern part of the country (Skåne) together with Copenhagen in Denmark constitutes one of the “strongest life science clusters”¹⁴. This region, which is also called Medicon Valley consist of a “dense cluster” of hospitals, biotechnological and pharmaceutical companies and it is known as the “educational center of Scandinavia” ensure an abundant pool of qualified labor force¹⁵. Finally, unlike other countries, the Swedish government takes role in fostering scientists who work in academic institutions to be able to commercialize their invention by introducing in legislation on intellectual property (Jeff Miller, n.d.).¹⁶ This ownership right over intellectual property is established through patent which grants to reward the originator of his/her new invention as well as a stimulus to innovation (Hill, Charles W.L., 2003). This can be clearly seen in the case of Athera’s founders, Professors Johan Frostegård and Ulf de Fair, as scientists working in Karolinska Institute, they have discovered a significant role of aPL in the inflammatory process of early CVD and have been able to register this discovery as their own intellectual capital. In this way, the government helps to promote organizational innovation by supporting the scientists to cultivate entrepreneurial culture.

Internal resources as highly skilled people are important to a successful firm in accordance with Penrose’ resources based theory. She recognizes the importance of development of high level of human resources (Augier & Teece, 2007). It is critical for a company especially one in the pharmaceutical industry to have high qualified employees with a lot of experience behind them. The importance of experience and qualification is more in relation with other industries, and many companies fail because they can not recruit people with enough experience (C. Sundberg 2008, interview, 28 April). This is in accordance with Grönlund’s statement that without the knowledge and creative ideas of the two founders of Athera, the company will not exist (H. Grönlund 2008, interview, 16 April). At the same time it was interesting to find out that he was responsible for the recruiting of all eight other employees, which he carefully based on previous experience and qualified knowledge in specific scientific areas (H. Grönlund 2008, interview, 16 April). The importance of highly educated, qualified and experienced people is found in AstraZeneca R&D as well. More specifically success for the company is based on the conversion of a new good idea to innovation, and in order to do that they want to recruit “the best talented” people. These people will generate “good ideas” which in turn will lead to successful innovations. (www.astrazenca.com).

¹⁴ Clinical Research in Medicon Valley, August 2007,
<http://www.mediconvalley.com/images/publications/Clinical%20Research%20in%20Medicon%20Valley.pdf>

¹⁵ Clinical Research in Medicon Valley, August 2007,
<http://www.mediconvalley.com/images/publications/Clinical%20Research%20in%20Medicon%20Valley.pdf>

¹⁶ University of California, San Francisco: Science café by Jeff Miller,
<http://www.ucsf.edu/sciencecafe/2007/hwh.html>

5.1 AstraZeneca (Model A)

Once a good idea is generated from a pool of highly qualified individuals it needs to be commercialized in order to become successful innovation. This aligns with Morrison's (2002) theory that entrepreneurial culture consist of attitudes toward commercializing an innovative idea. It is also in agreement with Schumpeter's definition that to be innovative it is not enough only to have a novel idea you need to bring it to the market in order to have successful innovation (cited in Swedberg, 2000).

All of the mention above is closely related to the process of the development and the endeavor of the biotechnological product to the market. It is a very long and difficult process that needs special expertise, "major commitment of time, money and resources" (www.astrazeneca.com). AstraZeneca has a Development organization within R&D which consist of qualified people whose main activity is to take a newly discovered compound from the laboratories through "clinical research, regulatory submissions, pharmaceutical development and life cycle management" (www.astrzeneca.com). If we follow Morrison's (2000) description of entrepreneurial culture, these particular employees in the Development organization are the ones that work towards commercializing innovative ideas and products. The top management in AstraZeneca R&D is represented by the R&D executive committee, which function is to develop a single common corporate R&D strategy and product portfolio. The committee is entitled at the same time to make decisions in connection to "therapeutic need, market opportunity and technical risk" (Annual Report, 2007, p.17) At the same time the executive committee must make sure both internal and external opportunities are evaluated through the same criteria and externalization strategy is aligned with the company's internal portfolio (Annual Report, 2007). One part of the internal strategies is to evaluate key features in the therapy and disease area, including "clinical need, commercial opportunities, scientific opportunity and competitive position and resources" (Annual Report, 2007, p. 23). From the mention above we can see that the R&D executive committee exercises entrepreneurial culture by finding external and internal strategies for commercialization of AstraZeneca's new products. Following our conceptual framework we can say that both staff and top management in AstraZeneca use EC to develop and maintain organizational innovation. Next we will examine the importance of corporate culture for the developing and maintaining of organizational innovation.

According to Kanter (cited in Swedberg 2000, p. 31) innovations within firms can be cultivated with excellent results. From his work we can see that corporate entrepreneurship focuses on how to create a corporate environment that is positive to the generation of ideas. Having an organizational structure which favors corporate culture can facilitate the completion of the new project and helps diffuse the innovation. This is supported by the range of global training programs to strength entrepreneurial abilities across the whole organization, not just one part (AstraZeneca Annual Report, 2007). Sadry & Lee (2001) also emphasizes on the importance of corporate culture as a requirement for successful organization. Further on they define the term "positive" corporate culture which consists of corporate vision, corporate values, which are consistent with the company's purpose and personal value of employees and all employees are highly involved within the organization as team members (Sadri & Lee, 2001, p.854) When we examine AstraZeneca's R&D we found similar patterns of positive corporate culture. Employees at all levels are encouraged to share a corporate culture "based on openness, innovation, respect, empowerment, customer focus, risk taking and global team working" (www.astrazeneca.com). The company also makes sure that all 66, 800 employees worldwide have clear understanding of the firm's objectives and goals. Among the core

values of AstraZeneca is improving leadership capabilities and making sure that all of the employees feel good and have a friendly working environment (Annual Report, 2007). Similar definition of corporate culture is offered by Maanen (2005). He describes corporate culture as the glue that holds the company together and he defines the term “strong” corporate culture which promotes employees at different levels to identify themselves with the company’s vision and goals (Maanen, 2005, p.291). According to AstraZeneca’s Annual Report (2007) all employees have a clear performance targets, which are developed together with their managers and at the same time are appropriate for the employee’s job description and the overall goals and objectives of the company. The alignment of company strategies and values applies as well in the company’s acquired firms. One example of such firm is MedImmune Inc., which was a US biotechnological company and has been acquired by AstraZeneca in 2007. Now the company will take over of forty percent of the whole R & D organization of AstraZeneca and will lead the development of biologics and vaccines, while AstraZeneca will concentrate on the small molecule research (Annual Report, 2007). MedImmune will keep its operational activities independent from AstraZeneca, but at the same time it will align its organizational strategies to the “overall R&D strategy and objectives” (Annual Report, 2007, p. 25). In addition scientist from both companies will be working in collaboration towards the achievement of common goals. The main goal for the R&D, as mentioned by the executive director Jeff Patterson is to “strengthen the pipeline, drive the pace of innovation and deliver a flow of new medicines” which will bring the most benefit to the patients (Annual Report, 2007, p.23). If the company has positive and strong corporate culture as mentioned above it will increase the efficiency and productivity of achieving the company’s objectives. And since one of the objectives is to discover new medicines, which can be related to our definition of OI and the process of creating, adopting, developing and implementing a new idea in connection to the creation of new product, corporate culture will help in the developing and sustaining of OI.

As mentioned above having entrepreneurial culture and corporate culture helps AstraZeneca to develop and sustain its organizational innovation. On the other hand networks and partnerships play very important role in the enhancing of the process of organizational innovation. In the pharmaceutical industry it is very important for companies to have access to the latest technologies in the field. In recent years it became evident that this can not be done only with the help of the in-house development. Pharmaceutical and biotechnological companies need to acquire knowledge resources from outside the company in order to keep up with the fast changing environment in pharmaceutical industry. (Bessant, Gupta & Smart 2007). This can be done through participation in innovation networks and it can take the form of mergers, acquisitions and strategic alliances. These innovation networks constitute of among others biotechnological companies, pharmaceutical companies and universities (Bessant, Gupta & Smart 2007). AstraZeneca R&D and Business Development strategic teams are working closer to identify the best opportunities for externalization of the company in order to complement its internal capabilities and resources. The best possible new partnerships are based on the ability of the future partners to add their own skills and resources which will in turn enhance the internal capacity of AstraZeneca. For example in 2007 the company entered into an “innovative deal” with Bristol-Myers Squibb Company to co-develop and co-commercialize two compounds being studied for treatment of Type 2 diabetes” (Annual Report, 2007, p.25). This agrees with Veludo (et al. 2004) that among the important characteristics of partnership is joint strategy, continuous will to improvement and sharing or risk and awards. Another example of their externalization strategy is the strategic partnership with academic institutions; in 2007 they entered in strategic alliance with Peking

University Third Hospital. One way of finding the right partners is done by attending conferences arranged by various organizations. In May 2007 the Strategic Planner team attended LES International Conference in Chicago, which main focus was to allow companies and scientist from all over the world to get involved in “targeted networking” and find valuable partners¹⁷.

Except the strategy of finding partner who will complement internal capabilities there is visible strategy for improving the development of new biotechnological products, through access to external innovation in AstraZeneca R&D. After reviewing information from their Annual Report (2007) we found out that there is one good example of acquiring important knowledge resources in the face of new technology through externalization. This is the acquisition of MedImmune Inc. in 2007. Now AstraZeneca has access to “world-class, vertically integrated biological vaccines capabilities” which at the same time give a way into “cutting edge technology, intellectual property and skilled workforce” (Annual Report, 2007). At the same time as mentioned earlier it is not enough to have a new idea or technology to be entrepreneurial, a firm needs to commercialize their products. The acquisition of MedImmune Inc. allowed AstraZeneca to take advantage of its vertically integrated, “end-to-end capabilities”, which include the process of discovering a new drug and the endeavors of commercializing it. In addition AstraZeneca got access to MedImmune’s in-house manufacturing facility (Annual Report, 2007). This in turn will enhance the in-house capabilities of developing new biotechnological products in AstraZeneca.

Pharmaceutical industry is different than other industries, because it is the most regulated by authorities and most of all it is very hard and complicated to bring a new biotechnological product to the market (C. Sundberg 2008, interview, 28 April). Still the process of pooling resources through networking, which has been mainly applied in high-technology, industrial industries and internationalization process, can be used in the pharmaceutical industry as well (Bower, 1993). This network approach recognizes the growing process of “technological and organizational learning”, through interaction in different networks (Bower, 1993, p.368). Furthermore this approach which originated from the findings of Håkansson (1987 cited in Bessant, Gupta & Smart 2007), allows a company not only to benefit from direct relationship with another company in their network, but at the same time to access important resources through “third party” providers in the face of other organizations, which belong to the network of the direct partnering company (Bower, 1993, p.368). This kind of recourse pooling is clearly seen in the relationship of AstraZeneca and MedImmune Inc. In 2002 MedImmune Inc. launched MedImmune Ventures, which is a venture capital fund. Through this fund MedImmune Inc. has invested in 25 different companies all over the world in order to obtain more novel technologies in the biotechnological arena (AstraZeneca Annual Report, 2007). AstraZeneca will benefit from the relationship and partnership of MedImmune Venture by gaining access to the newest technology facilitated by this “third party” contribution of the members of MedImmune innovative network. Finally the knowledge resource obtained through these networks will enhance the overall process of successful organizational innovation of AstraZeneca.

¹⁷ LES 2008 Spring Meeting & LES International Conference,

<http://www.usa-canada.les.org/meetings/2008spring/PowerNetworkingOrgProfiles.pdf>

5.2 Athera Biotechnologies AB (Model B)

In Athera's case, the government helps to promote Organizational Innovation by fostering high skill employees. According to H. Wallberg-Henriksson, the president of Karolinska Institute, half of the funding to Karolinska Institute is supported by Swedish Government (Jeff Miller, n.d.).¹⁸ She emphasizes that in order for Karolinska Institute to become a leading medical university in Europe, sufficient funding is crucial.¹⁹ First of all, Karolinska Institute supports Karolinska Innovation AB with the principle to provide Karolinska Institute's researchers with alternatives in commercializing academic inventions.²⁰ Moreover, Karolinska Institute supports Karolinska Institute Science Park AB with the purpose of contributing to commercialization of research and exchanging information among researchers in Karolinska Institute.²¹ Athera AB itself is in fact established in Karolinska Institute Science Park.²² This conveys that government has taken a role to foster these skillful researchers who then become important assets of the company. And later on, these top management and staff must be equipped with the strategic tools as the requirement for Athera to develop and sustain organizational innovation

Based on our findings, the very first crucial tool executed by top management is Entrepreneurial Culture. Schumpeter (cited in Swedberg, 2000 pp. 15, 16) describes entrepreneurship qualities as "the introduction of new good", and "the opening of a new market". This is relevant to Grönlund when he emphasizes that to be able to compete with giant companies, small company like Athera needs to develop a brand new and novel product. Schumpeter also makes a clear distinction between entrepreneur and capitalist, describing the latter as only "owners of money" and "material goods" (cited in Swedberg 2000, p. 58). He emphasizes that just because you invent something it does not make you an entrepreneur. You need to bring it into the market and be innovative (cited in Burns 2005, p. 245). This is as well in agreement with Morrison (2000) attitude towards commerce which is at business level. Referring to the interview findings,

"SME have to be innovative from the beginning and have to set clear goals. After you have innovative product you have to concentrate on gathering money from investors and focus only on bringing the product to the market" (H. Grönlund 2008,p.34).

Therefore, Entrepreneurial Culture is crucial for top management, who has experience in both academic and business sector, and not for all employees (H. Grönlund 2008, interview, 16 April), as he/she is responsible to bring the novel product/idea into the market to convince the customer that the product is usable and reliable. This is in contrast with the employees which

¹⁸ University of California, San Francisco: Science café by Jeff Miller, <http://www.ucsf.edu/sciencecafe/2007/hwh.html>

¹⁹ University of California, San Francisco: Science café by Jeff Miller, <http://www.ucsf.edu/sciencecafe/2007/hwh.html>

²⁰ Karolinska Institutet Innovations AB, by Cecilia Ohlsen, http://www.karolinskainnovations.ki.se/about/background/index_en.html

²¹ Karolinska Institute Science Park AB, http://www.ki.se/sciencepark/about/index_en.html

²² Karolinska Institute Science Park AB, http://www.ki.se/sciencepark/companies/index_en.html

do not exercise much of entrepreneurial behavior within the organization. There is no time to practice entrepreneurial culture since the staff needs to actively succeed in their target, which is to be able to make return to investors (H. Grönlund 2008, interview, 16 April). Moreover, Grönlund mentioned that the reason the company chooses to develop a drug only in one area (CVD) is because it is the leading cause of death, accounted for 17 million deaths worldwide annually (Annual Report 2007). This aligns with the theory of Schumpeter which defines the motivation of the entrepreneur as his/her dream and will to concur. In Athera's case, the owners' main motivation is not connected only with financial benefits, but with the will to cure and prevent CVD.

Another significant tool which must be internalized by both top management and employees within Athera is Corporate Culture. When examining the case of Athera, we find that the company possesses one of the components of positive corporate culture defined by Sadri & Lee as showing an importance of personal value of employees to boost the working environment in the organization. From our interview it was clear that in Athera, both staff and top management stress an importance of this by showing respect and equality towards one another (H. Grönlund 2008, interview, 16 April). However, the company doesn't publicize much about its mission statement which is primarily discuss as a composition of positive corporate culture in according to Sadri & Lee. Perhaps, the best explanation for this is the company's relatively small size with only 7 employees (excluding the two founders and Grönlund) and does not need to have an explicit mission statement publicized as much as in the case of big organization like AstraZeneca. Moreover, the staff is recruited by Grönlund based only on the criteria of their common personal value, in this case, respect and equality; thus, these staff already knew what they were expected to do since the first time they joined the company. This means that a common value among staff already exists in the firm. Therefore, we can say that insufficient information on company's mission does not convey that Athera do not possess a positive corporate culture. Moreover, according to Maanen (2005), culture operates as a bonding device holding an organization together – the superglue that connects structural elements of a firm to its economic, political, and social strategies, and ultimately to the results it obtains from the marketplace. Corporate culture within Athera is selected since the company is founded. Grönlund choose to recruit the compatible staff that can get along and work efficiently in a friendly environment together in order to achieve a single goal. Grönlund mentioned that corporate culture is especially important in the small company in comparison with big ones because big companies often have sufficient fund to train the staff while the small one need to recruit the right people who can be adaptive to each other personalities and comfortable working together (H. Grönlund 2008, interview, 16 April). Every employee works toward the same direction to accomplish the same goal. This is even further supported by the interview that organizational innovation is promoted among individuals in the teams by meeting regularly (H. Grönlund 2008, interview, 16 April). In other words, once the employees who share the same goal meet regularly, this helps to promote positive corporate culture which in turn will enhance the developing and sustaining of organizational innovation within the firm.

The third essential tool for developing and maintaining organizational innovation is network and partnership. Burt (cited in Swedberg 2000) emphasizes the importance of benefit-rich network and trust. In his context, network rich in information benefits mean reliable sources of information to and from the place where information sources have been created (cited in Swedberg 2000, p.288). In this case, Athera has developed 7-8 network partners through an academic source like Karolinska Development (H. Grönlund 2008, interview, 16 April). Once Athera was supported by Karolinska Development (KD), it has already established

networking with these partners. All companies supported by the KD are selected on the potential of their project.²³ In this way, Athera, as well as, other companies which are supported by KD can exchange knowledge as well as valuable information through their networking. Also, according to Burt, the imperfect competitive world relies mainly on creating of networks based on “personal contacts” (cited in Swedberg 2000, p. 288). In addition, Sundberg supports the importance of personal networks within pharmaceutical industry (C. Sundberg 2008, interview, 28 April). This aligns with the fact that Athera mainly develops its network through personal contacts from all levels of employees. For example the company’s founders have a close connection within academia in the face of Karolinska Institute (H. Grönlund 2008, interview, 16 April). This is especially important within this type of industry and especially for a start-up company like Athera, which has been able gain valuable information and resources and to create novel products through their good connection with academic institutes (C. Sundberg 2008, interview, 28 April). According to Veludo, Macbethe & Purchase (2004) one of the most significant characteristic when it comes to partnership is trust which agrees with Burns (2005), ‘Entrepreneur Spiderman’, who relates the core of entrepreneurial approach to the development of relationships within and across organization based on trust and respect. These theories convey the significance of trust for partnership. This is shown in the case of Athera by their connection with Phadia, which is Athera’s kits production company located in Germany (H. Grönlund 2008, interview, 16 April). From the interview it was clear that Athera entered this partnership based on a personal contact of Grönlund. Who also said that the key role when you are looking for suppliers of materials especially for the ‘crucial material’ is to go to those you know and most importantly to those you trust. This relationship is prominently based on credibility and trust. As equally important as the network outside the organization, there must also be respect and equality among employees within the company (H. Grönlund 2008, interview, 16 April).

Athera network and partnership development is created through personal contacts from both top management and employee level. The most important factor in choosing to enter a particular partnership is trust. Since Athera is a small company it does not have enough time and resources to look outside of its personal network for new partners. The company also does not intend to acquire additional resources and knowledge for its product. The network is used as a tool only to maintain and continue to develop the already existing product.

6. Conclusion

Organizational Innovation within biotechnology companies is indispensable if firms want to survive within a competitive environment. Sweden has been a country where investors from around the world make use of its innovativeness in this particular industry. In our thesis we examined the stages of how organizational innovation is created, developed, enhanced and maintained in AstraZeneca and Athera. We also looked into how companies develop their networks and partnerships and how this in turn affects organizational innovation. In order to do that, we used some important concepts from theories and models such as Networks and Partnerships theories and Entrepreneurship theories as strategic tools to describe the process of organizational innovation within Athera and AstraZeneca. Our

²³ Karolinska Development 2008,
http://www.karolinskadevelopment.se/index.php?option=com_content&task=view&id=15&Itemid=30

conceptual framework is based on the government influence over innovation, the importance of skilled and educated employees, entrepreneurial culture, corporate culture and Networks.

Sweden is considered as a leading country in the pharmaceutical and biotechnological industry. At the same time the country is a part of one of the biggest life-science innovative clusters, including biotechnological companies, pharmaceutical companies, universities and hospitals. During our research we have found that the government promotes education in this area in order to keep its high position among other countries. This promotion is done through different scholarships and grants for students and researchers. Favorable government regulation at the same time makes it easy for a researcher to obtain the rights over his novel innovation. With all this said we can see that highly educated people exist in this particular region, which in turn is good for the existence of pharmaceutical and biotechnological companies. Since if we follow our conceptual model high qualified and educated TM and Staff are both essential parts of developing and maintaining organizational innovation in two Swedish companies – AstraZenca and Athera.

Top management in Athera is responsible for the commercializing of the products, which relates to having entrepreneurial culture. At the same time it is hard for the employees to participate in these entrepreneurial activities because they must focus only on the further development of the already discovered novel product. Since we have learned from the interview with Grönlund, for the small company the most important thing is to be entrepreneurial in the beginning when you discover the new product. Afterwards due to lack of financial resources and time, the employees can not be involved in entrepreneurial culture. It is enough to be entrepreneurial one time. Even though the company is exercising entrepreneurial culture only at TM level, we still think the company can be classified as innovative, because it is created on the base of a novel discovery and there is a lot of work left for the diffusion of the innovation and for maintaining it in the market. Also we can apply the definition of Schumpeter that to be considered entrepreneurial and innovative you need to discover a product/process which is novel and not an imitation and that is exactly what the founders of Athera have done. On the other hand, AstraZeneca R&D is executing entrepreneurial culture on both top management and staff level. The R&D executive committee which is represented by TM in our model is entitled with discovering and exploring external and internal strategies in connection with the commercialization of innovative products. Employees from the Development organization, which represent staff in our analyses, have the task of bringing the product to the market from early stages of discovery. In both Athera and AstraZeneca, highly skilled employees whether TM or Staff are equipped with corporate culture as a tool to hold the unity, possess the same value and work toward a single corporate goal. When employees at all levels of the organization share common objectives, work towards the same goals and identified themselves with the company's value, as in the case of Athera and AstraZeneca, this helps to compel the faster process of organizational innovation.

Personal network is the last but not least vital strategic tool to complement the developing and maintaining of organization innovation within Athera. Still the network is not used as a tool of acquiring new technological knowledge, since the company is not interested in creating other innovative products as the ones that it already has. Through its personal network the company tries to further develop and sustain the already existing innovative product. This is in contradiction with the strategy of AstraZeneca, which uses network as a unique element to enhance organization innovation. AstraZeneca uses networks as to gain access to the latest technologies available in the market, which will help not only in the enhancing of innovation

but in the completion of as many new products as possible. In conclusion we can say that AstraZeneca is using networks, mainly in the form of acquisitions, mergers and strategic alliances to complement its innovative product portfolio, while Athera is relying on personal networks and strategic partnerships in order to develop and sustain already created novel product. Another interesting finding from our research is that when seeking for new partnerships Athera is focusing mostly on how trustworthy they are, while AstraZeneca is looking more for partners who can supplement the company's in-house capabilities with additional skills and innovative resources.

Organizational innovation is essential for biotechnology and pharmaceutical companies to maintain its competitive advantage in this industry. Network, entrepreneurial culture and corporate culture are very important factors when it comes to the development, the maintaining and enhancement of organization innovation in order for AstraZeneca and Athera to be able to effectively propose, adopt, develop, and implement any new idea in relation to a product, process, policy, practice, behavior, program and service that has been generated.

After examining both cases we can conclude that the SME (Athera) is able to compete with the MNC (AstraZeneca) through the discovery of a completely new product that has not been yet introduced in the market. Athera also fits perfectly into the definition of Schumpeter that to be entrepreneurial you need to invent something new without imitating others. From our interview with Grönlund it became clear that in order to be successful, a small company like Athera needs to come up with a completely novel product and can not rely on benchmarking already developed products from MNCs. Figure (4) shown below is the comparative conclusion of the two companies.

ATHERA (SME)	ASTRA ZENACA (MNC)
Sweden as innovative country, essential to promote OI	
One time – Founders	Top Management & Staff
Posses the same value and works toward a single corporate goal – Foster Process of Organizational Innovation	
<ul style="list-style-type: none"> • Develop & maintain OI • Personal Network • Trustworthy criteria • Already Existing products 	<ul style="list-style-type: none"> • Element to enhance OI • Merger, Acquisition & Strategic Alliance • Acquire latest technologies • Innovative Resources criteria

Figure (4) Comparative Conclusion of Athera and AstraZeneca (Source: Our own)

7. Implication

Since innovation is said to be the key to a success of pharmaceutical companies, our thesis contributes to scrutinize an organizational innovation process within the two companies. Nevertheless this does not bring to a close conclusion that innovation is the only determinant factor for any SME to compete with any MNC only by implementing the process of innovation mentioned in this paper. There are internal as well as external variables involved when investigating a firm's success such as firm structure and strategy, size, demand conditions and specifically for the pharmaceutical industry, regulation of patent and intellectual property which varies depending on the country. These mentioned factors are somewhat need to be considered as influences towards a success of a company as well. In another word, even if the pharmaceutical company is able to follow the stages of developing, maintaining and sustaining organizational innovation. That does not pin point a success of a pharmaceutical company.

After trying to answer our strategic question of how an SME can compete with MNC within this industry, a question arised in our minds as whether is it necessary to seek for a clear explanation. After we investigated the two companies we found out that network and partnerships for both companies play an essential role in developing, maintaining (Athera) and enhancing (AstraZeneca) organizational innovation. Following this finding, a new question comes across our mind of how an SME can collaborate with MNC to bring success to the organization. A relevant answer to this is actually shown in our paper when analyzing network as a tool to bring in more technological innovation especially in the case of AstraZeneca R&D when merging with MedImmune. It seems that when the small company has come up with very good innovative product, this can attract the bigger firm to make a move towards some kind of strategic partnership or acquisition. This future partnership regardless of its type will give the MNC access to latest technology and an access of the SME

to more financial resources. We found that network cooperation seems to be vital to organizational innovation process. Further on we will suggest a deeper research into the collaboration and mutual beneficial relationship between SME and MNC in pharmaceutical and biotechnological industry.

8. Suggestion for Further Research

Our thesis project focuses on organizational innovation and the external and internal factors that affect it in two Swedish companies. Most of all we have emphasized on the government influence through the creation of high educated people; the importance of entrepreneurial culture, corporate culture and networks and partnerships in the organizational innovation of these companies. Still there are many other factors that have an impact on innovation in this particular industry such as patent and government regulations. It will be very interesting to examine how government regulations affect innovation in different countries, since every country has its own policies regarding patent period, commercialization of novel products and rights over intellectual property. All of this can contribute to a more detail research into developing, maintaining and enhancing organizational innovation.

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Pharmaceuticals, biotechnology and medical technology – an Integral Part of Innovative Sweden

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http://www.swedenbio.com/upload/Publications/Reports/Government%20Strategy%20document_biotech2005.pdf

University of California, San Francisco: Science Café

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www.ucsf.edu/sciencecafe/2007/hwh.html

Appendix A

1st Respondent Background (*www.athera.se*)

- Dr. Hans Grönlund, VP of Diagnostics, BSC, Ph D
- 20 years experience of both science and business fields: diagnostic test, reagents development and marketing.
- Former management team of Pharmacia Diagnostics and National Bacteriology Laboratory, including Research Manager Biochemistry, Director of Reagents, Scientific Marketing Manager and Clinical research Manager.
- Inventor of three patent applications and has published 25 original articles.

2nd Respondent Background (*Karolinska Institute*)

- Dr. Carl J Sundberg MD, PhD, University Lecturer, Associate Professor Coordinator Science & Society at the President's office at Karolinska Institute. Department of Physiology & Pharmacology/Unit of Bio-entrepreneurship

Appendix B

Interview Questions

Background of Hans Grönlund:

- *He got his PhD in Karolinska Institute*
- *Worked as consultant*
- *Karolinska/money/capital venture*
- *Supervises master student s at Karolinska at the moment*
- *Former Manager and Director of Pharmacia in Uppsala*
- *His expertise is diagnostic – ha has both science background and managerial*
- *Recruited people for Athera from different expertise fields. Special person for each task. He aimed at recruiting very successful people with 20 to 30 years experience and very good qualification.*
- *Now Athera has 8 employees plus the two founders and a store in Uppsala*

Background of Athera:

- *Athera's competent academic research is approved by Karolinska Innovations which in turn forward the company to Karolinska Development which is now the main owner.*
- *Athera's production unit is located in Germany called Phadea.*

1. We believe that your company is a R&D biotechnology company focusing only on to develops products for risk assessment and treatment of CVD, explain how and why the company chooses to develop its biotechnological innovation within this certain area? Do you have any future plan on product development in any other particular areas? What is the delimitation?

Intellectual property – patents plays vital role in pharmaceutical industry. If you can not protect your idea you should not start the company. You must have a unique new product which will lead to some difficulties when it comes to bringing it to the market. Since you need to teach your customers (in this case doctors and nurses) and they will resist you and still prefer to use old products due to doubt in the new invention. In the case of Athera the product was found by one of the founders and he was able to protect his idea on time. Validating and protecting new idea/product is a very hard and long process and involves the validating of the product/idea in terms of 1.5 year after the invention. The product has to pass business units requirements (development). It is a very formal (everything needs to be written down) process which has to be done from people with previous experience in validating new products. It's unlike in an Academic Discovery. Actually this gives a different meaning to 'Research' and 'Development' as well. Come to future plan, aside from the diagnostic of protein market, the development in any other direction depends upon our stock in the market.

2. Does the company classified itself as a CRO? How many projects have the company established since founded and in which clinical phase?

No. Athera is based on the research provided by the two professors and founders. It is more concentrated in the development of new kit – the founders already knew what will be developed, still the tendency of research is that you don't really know if it will work successfully. "Personally I call it development not research". The only project so far is within the CVD area since there is enormous challenge in that area, but maybe in the future the company will look into the developing of other markers.

3. How significant is the existence and the fostering of entrepreneurial culture among employees within your organization? Is entrepreneurship important for your company in order to compete with other firms? Give example

For the main owner, they actively practiced entrepreneurial culture; however, among employees, they do not have enough time, their main object is to reach the goal. Entrepreneurship is important especially in the start of the company; you have to discover something novel to be able to compete with other organizations. After the new product is discovered there is not so much time for being entrepreneurial. You have to be able to discover something that has not been discovered yet, you can not compete with variations of products that other MNC companies already have discovered, and you have to create something better and novel. Then it becomes a matter of delivering the product to the market and commercializing it. The new start-up small companies are very dependent on the stock market. Karolinska development and Karolinska Innovation play important role in fostering entrepreneurship among small start up companies

4. How does the company create and utilize its organizational innovative strategies? How do you promote innovation among individuals and teams? Any incentives? Give example

The employees regularly meet with investors as well as colleagues to discuss product development. For example: "How do we measure stroke?", "How to sell more of the already discovered and developed product?"

5. Does corporate culture play a significant role in the organization when it comes to reaching the firm's goals?

Yes. Corporate culture plays extremely important role in our company. We use first name bases when meeting and we make sure we are comfortable with each other. There must be also respect and equality among us. This is much more important in the small company than the big one. This is because big companies have sufficient fund to train their staff while the small one need to be adaptive to each others personalities. Since all these factors are very important for the future success of the company I tried to recruit collaborative people so we can all get along and work in a friendly environment.

6. What is the key strategy of the company to survive in the fast changing environment of the pharmaceutical industry and keep up with the strong MNC competition? Can you give some examples of external and internal factors that affect the development of the company?

You have to come up with something completely new that has not yet been discovered, 'new & novel'. You can not benchmark against the products that are already on the market. For example Athera is selling right now a new market kit with which the consumers are not familiar. That is why the hardest part is to make consumers (doctors and nurses) aware of the new product and convince them at the same time that the product is good and even better than previous ones. SME have to be innovative from the beginning and have to set clear goals. After you have innovative product you have to concentrate on gathering money from investors and focus only on bringing the product to the market.

7. How do you develop relationships with customers, staff, and suppliers? What are the main criteria for choosing to enter in particular partnership? How important is partnership for your business? Who are the current company's industrial partners and which type of collaboration do you use?

Partnerships are developed mainly through broad personal networks and even overlapping networks among the employees. For example the company that produces Athera's kits is located in Germany and called Phadea. It would have taken much more time to have the production in Sweden instead. Hans knew the production manager in Germany and that's how the relationship was established much faster. Key role when you are looking for suppliers of materials especially for the 'crucial material' is to go to those you know and most importantly trust. For other less significant material, of Athera buys from the supplier who can offer a cheaper price. There is no energy and recourses to look for new contacts excluding the one in your personal network. The CEO role is to promote the company products and that way trying to attract investors. Industrial partners can not be disclosed, private.

8. On your web site it says you are looking for partners with focus on co-marketing and co-development of early risk markers for CVD, what kind of qualities are you looking for in your future partners, if we exclude technological expertise?

When looking for key producers the partners must be on the market of CVD diagnosis and has interest to co-develop the drug. If your product is good the big diagnostic companies will want to add it to their portfolio. Marketing is very costly and SME use venture capital. As for Venture Capital, Athera is looking for a company which has an interest to invest and expects a good return.

9. What does your partnership with Karolinska consist of and what are the benefits your company receives from this particular relationship? Did you acquire the partnership with other academic partners like for example Uppsala University through your relationship with Karolinska or through some other network channels such as personal network or personal contact?

Karolinska Development is the main owner of Athera and it is also the main source of funds. Karolinska Innovation is a “gate keeper”, or a “net”, which means that it decides if it believes in your company’s innovative idea. If that is the case it sends the project to Karolinska Development for funding. The CDV immune project is also financed by the EU. In this way, Athera has already established 7-8 network partners. Karolinska Institute is on the board of directors of Athera and it makes sure everything goes on schedule and checks how the work progresses.

The two founders have a very good network within academia – they know “the whole word of academia”!

10. Some personal opinion about SME in pharmaceutical industry

The money is not enough to be big and grow; you need venture capital in order to bring the ideas to the market. There is a big difference to grow to medium from small size company. Sometimes people are not skilled enough and do not have enough diagnostic knowledge as well.

Telephone Interview Questions – Carl Sundberg (KI)

1. Background information of the interviewee?

- *Medical Doctor*
- *Involved in Venture Capital*

2. If organizational innovation is defined as the process of proposing, adopting, developing and implementing a new idea, product or process, what can you say about innovation from Bio-entrepreneur’s point of view? How is it difference from innovation created by Entrepreneur from other fields?

Pharmaceutical Industry is very similar to other industries when it comes to product and service. The difference is that it is the most regulated industry and the process of getting new product is very complicated and long. What complicates things more is that e government regulates the process. Another difference is the importance of intellectual property; it is the densest area of all.

3. Does entrepreneurial culture have a significant contribution in biotechnological companies? Can you give an example?

It depends on the area of the world. For example USA is more entrepreneurial are than Europe. Still Scandinavia and more specifically Sweden and Denmark are leaders in biotechnological/pharmaceutical industry when it comes to Europe. The entrepreneurs are more likely to foster in this two countries.

- 4. Can a strong corporate culture within Biotechnology companies be considered as influential factor for the success of a Bio-entrepreneur? Why? If not, why not? Please give example.**

Intermediate ability

- 5. What advantages can a Biotechnology company gain from having a strong tie (network) with academic institutions? How significant are this kind of network relationships? Please give example.**

Networks are essential for the company, especially in the form of relationships with other pharmaceutical companies and strong relationships with universities. It also depends on what the company is developing and if it is inventor of a completely new tool.

- 6. How important networking and partnering (verb) is within this type of industry? How does this type of company usually establish a relationship when it comes to partnership?**

Own personal networks are very important. A certain company also aims to recruit good board of director, international board and scientific board. Constant communication within networks is important and building of personal networks is based mainly n finding the contacts with the most experience.

- 7. Would you give me three statements that characterize organizational innovation in biotechnological company/industry?**

- *High Quality Science*
- *Clinical or Market relevance*
- *Much more experience compare to other industries. It is vital to recruit people with a lot of experience who are usually in the age of 40-50. Many companies fail because they can not recruit people with enough experience and knowledge. This in turn depends on the scientific cluster where the company is located. A lot of companies fail because they are located in regions (ex. TN< USA) where there are no high qualified individuals with long experience in medicine, biotechnology and pharmaceuticals. So the company has to move to high developed science clusters (regions), such as Boston for example in order to survive.*