Knowledge Transfer within Clusters
The case of Sustainable Sweden Southeast AB

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“Coming together is a beginning; keeping together is progress; working together is success.”

_________________________________________  Henry Ford
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Abstract

Knowledge is nowadays ever-present and often described as an intangible asset, but in contrast to other assets; the consumption of it does not diminish the quantity left for others (Nonaka and Teece, 2001).

Due to the importance of knowledge, the premise of this thesis is to identify, describe and analyze how a cluster can transfer knowledge. The methodology used was based on a single case study with a systematic combining approach. The case study within this thesis is about the cluster of Sustainable Sweden Southeast (SSSE) which contains personal interviews with several actors of the cluster of SSSE.

The theoretical framework entails the fundament on which the study is based, including definitions of knowledge, knowledge transfer, the actors and the influence of relationships during the transfer of knowledge.

There is an analysis done by linking the theoretical framework to the empirical findings on how SSSE can transfer knowledge within its actors. Additionally, there is a description about the barriers faced during the knowledge transfer and the influence of relationship building within this process.

Finally the conclusion should provide the reader with valuable insights according to the knowledge transfer within clusters. It incorporates the relevance of special actors and their influence in the process, as well as the possible barriers that could be faced and the relationship building process within clusters. The thesis ends with recommendations and managerial implications for SSSE.

Keywords: Knowledge, Knowledge Management, Knowledge Transfer, Cluster, Relationship building, Gatekeepers.
# Table of Contents

Acknowledgements .......................................................................................................................... 2  
Abstract ........................................................................................................................................ 3  
Table of Contents ............................................................................................................................ 4  
1 Introduction...................................................................................................................................... 7  
  1.1 Background................................................................................................................................ 7  
  1.2 Research Problem .................................................................................................................... 9  
  1.3 Research Questions ................................................................................................................... 9  
  1.4 Purpose ..................................................................................................................................... 10  
  1.5 Thesis Outline .......................................................................................................................... 10  
2 Methodology .................................................................................................................................... 12  
  2.1 Research Method .................................................................................................................... 12  
  2.2 Abductive Research Approach ................................................................................................. 12  
  2.3 Case Study Strategy .................................................................................................................. 13  
  2.4 Case Study Design .................................................................................................................... 14  
  2.5 Empirical Data Collection ....................................................................................................... 15  
  2.5.1 Interviews ............................................................................................................................ 16  
  2.5.2 Interviews with the Case Company ...................................................................................... 16  
  2.6 Research Quality .................................................................................................................... 17  
  2.6.1 Internal Validity ................................................................................................................... 18  
  2.6.2 External Validity ................................................................................................................... 19  
  2.6.3 Reliability .......................................................................................................................... 19  
3 Theoretical Framework .................................................................................................................. 21  
  3.1 Clusters .................................................................................................................................... 21
3.2 Knowledge ................................................................. 22
3.2.1 Knowledge Definition ........................................... 22
3.2.2 Types of Knowledge ................................................ 22
3.3 Knowledge Management ............................................ 23
3.3.1 Definition of Knowledge Management ......................... 23
3.3.2 Knowledge Management Process .............................. 23
3.4 Knowledge Transfer .................................................. 24
3.4.1 Definition of Knowledge Transfer ............................... 24
3.4.2 Modes of Knowledge Transfer .................................... 25
3.4.3 Actors within the Knowledge Transfer ......................... 27
3.4.4 Barriers of Knowledge Transfer .................................. 28
3.5 Relationship Building ................................................ 29
3.5.1 Definition of Relationship Building ............................. 30
3.5.2 Relationship Building Process ................................... 30
3.5.3 Relationship Building Motivators ............................... 31
3.6 Theoretical Summary ................................................ 33
4 Empirical Findings ...................................................... 37
4.1 Sustainable Sweden Southeast AB (SSSE) ....................... 37
4.1.1 SSSE’s Strengths .................................................... 39
4.1.2 SSSE’s Weaknesses ............................................... 39
4.2 Knowledge Transfer Process ....................................... 40
4.3 Knowledge Transfer Barriers ....................................... 40
4.4 Business Relationships in SSSE ................................. 41
4.5 Business Relationships Motivators ............................... 41
4.6 Business Relationships Barriers ................................. 42
Knowledge Transfer within Clusters
Growth through Innovation and International Marketing - Master Thesis

4.7 Empirical Summary.................................................................................................................. 43

5 Analysis........................................................................................................................................... 46

5.1 Knowledge in SSSE..................................................................................................................... 46

5.2 Knowledge Management Process in SSSE............................................................................... 46

5.3 Knowledge Transfer .................................................................................................................. 47

5.3.1 Modes of Knowledge Transfer ............................................................................................ 48

5.3.2 Actors within the Knowledge Transfer .................................................................................. 49

5.3.3 Barriers in Knowledge Transfer ............................................................................................ 49

5.4 Relationship Building Process SSSE ....................................................................................... 51

5.5 Analysis Summary .................................................................................................................... 52

6 Conclusions.................................................................................................................................... 56

7 Recommendations ....................................................................................................................... 60

7.1 Limitations of the study ............................................................................................................. 60

7.2 Recommendations for further Research.................................................................................... 60

7.3 Managerial Implications ............................................................................................................ 61

References........................................................................................................................................ 65
1 Introduction

Chapter one provides an explanation of the background and the motivation for writing this thesis. In addition, it describes the problem that aroused followed by the general and specific research questions of the study. Finally the purpose of the thesis is stated.

1.1 Background

“Paradoxically the enduring competitive advantages in a global economy lie increasingly in local things – knowledge, relationships, and motivation that distant rivals cannot match.” (Porter, 1998)

According to Nonaka and Teece (2011), nowadays the term of knowledge is ever present and is an overall valuable asset. They argue that knowledge is the key to business and corporate success and that it constitutes a competitive advantage for an organization (Nonaka and Teece 2001). Therefore the challenge for organizations is to handle knowledge in order to be competitive (Ichijo and Nonaka, 2007).

As it is described further by Nonaka and Teece (2001), knowledge can be addressed to three dimensions: the dynamic, humanistic and relative dimension of knowledge.

The dynamic one says that knowledge is created within social interactions among individuals and organizations. Furthermore knowledge is humanistic due to its relatedness to human actions. But it is important to state that without a context, knowledge has no meaning and stays as simply information. However, information only becomes knowledge when it is interpreted, guided by a context and firmly fixed in the commitment of individuals or organizations (Nonaka and Teece 2001).

Additionally, typical characteristics of knowledge are that it is intangible, boundaryless and dynamic. It can also be distinguished in two categories: explicit knowledge, which can be expressed in numbers and words; and tacit knowledge, which is highly personal and hard to formalize (Nonaka, Konno, 1998). However, it depends on an
organizations ability to identify the type of knowledge it possesses and the most suitable form of transfer.

When it comes to the knowledge transfer, the need of transferring knowledge within organizations is evident. Knowledge transfer is “two-way” – an exchange between the source and the receiver of knowledge (Ichijo and Nonaka, 2007).

However, knowledge transfer can be described as highly complex. If the focus then again lies on knowledge transfer within a cluster, the complexity will certainly not be reduced (Bukh et al, 2005). In contrast, a cluster is described as a concentration of interconnected companies. The specialty of clusters is that they are encouraging cooperation and competition at the same time (Porter, 1998). Inside a cluster organizations are partners and outside a cluster some of these organizations may compete against each other. As a consequence, the transfer of knowledge within a cluster is guided by various obstacles (Porter, 1998).

Therefore according to Ichijo and Nonaka (2007) knowledge management, which incorporates the process of transferring knowledge, should even become a core competency in order to reduce complexity. Sharing knowledge across regions, functions and businesses will assist organizations to increase profitability.

Especially within clusters, relationships provide a fundamental base for cooperation, which is in turn needed when knowledge should be transferred. As it is said by Grönroos (1994), strong relationships can help to reduce complexity within knowledge transfer. Within the current literature and regarding to the relevance of intra-organizational relationships, these interactions are termed as new paradigm.

However, going back to the previous mentioned statement of Porter (1998), knowledge and relationships can be described as overall relevant topics for all organizations, which are in addition closely-linked and interfering with each other, with a final objective of gaining competitive advantage.
1.2 Research Problem

Clusters agglomerate a high potential of knowledge due to its various actors and specializations. Therefore it is important to manage and coordinate the transfer of this knowledge among the actors, because knowledge has no value if it is not used at a certain specific place and time (Nonaka and Konno, 1998).

Moreover, the transfer of knowledge is already complex and faces several obstacles. Possible barriers which can occur during the knowledge transfer could be, according to Szulanski (1996), lack of motivation, reliability or arduous relationships. Beyond that, knowledge transfer requires a highly-commitment from the involved actors, especially in a cluster, which is characterized by a broad variety of different actors (Bush et al., 2007).

Knowledge is created during social interactions and these interactions or exchanges between actors are accompanied by the existence of trust and commitment. A certain level of trust for instance can enable relationship building, which in turn can also influence the knowledge transfer (Ichijo and Nonaka, 2007). According to Szulanski (1996), it is also important that the source and receiver of knowledge are motivated to transfer knowledge which refers to the importance of commitment, otherwise the process is more complex. If there is a lack of these elements, then they could be a barrier for the transfer of knowledge.

1.3 Research Questions

The following research questions have been formulated according to the research problem described above. The focus will be on the fact of HOW knowledge can be transferred within a cluster. As a result the research questions within this thesis are:

Main Research Question:

How can knowledge be transferred within a cluster?

This study is based on this main question, whose aim is to outline how a cluster can transfer knowledge, analyzing the possible barriers that can be faced, as well as the
actors involved and their relationships within the cluster. These factors are taken in count in the next research sub questions for this study:

Research Sub-Questions:

Which barriers are faced when knowledge is transferred within a cluster?

This question is about the barriers that clusters could face within the knowledge transfer.

Which role do the actors of a cluster play during the transfer of knowledge?

Within this research question the focus lies on the role that the actors of a cluster play during the transfer of knowledge.

How can the actors of a cluster build long-term relationships among them and what could motivate this process?

Within this question the focus is on the importance of building relationships within clusters and the motivators for this process in the transfer of knowledge.

1.4 Purpose

The objective of this thesis is to describe the transfer of knowledge within a cluster and to gain valuable insights by identifying the possible barriers that could be faced during the process. A special focus lies on identifying and analyzing the role played by the different actors within the cluster and their relationship building process. Then recommendations will be provided regarding the process to transfer knowledge within the case company and the opportunity areas that aroused.

1.5 Thesis Outline

The Thesis will be divided in six chapters. The first chapter refers to the introduction of the topic, explaining the background and the research problem, followed by the research questions and the purpose of the study. The second chapter regards the methodology used to gather and structure the information of the study. The third chapter
is about the theoretical framework containing of knowledge transfer and relationship building, that was used along the research and that served as a basis for the analysis. The fourth chapter encloses the case of the cluster Sustainable Sweden Southeast AB (SSSE), counting with the total support of Ann-Christin Bayard to develop the research and collect information within the organization. The fifth chapter points out to the analysis made after the data collection and how the information can be interpreted. Finally, the sixth chapter comprises the conclusions made after analyzing the information and aims to answer the research questions of the first chapter, followed by the seventh chapter that provides recommendations for SSSE.
2 Methodology

Chapter two provides the methodological application on which the thesis is based. In the following an account of the approach and method of research will be taken as well as the explanation of the research strategy. Finally there will be a discussion about the validity and reliability of the collected data on which the case study is built on.

2.1 Research Method

According to Merriam (2009) qualitative research is the appropriate method to achieve a deeper understanding of a subject.

Yin (2009) describes further that there are several types of research strategies like surveys, experiments, but especially points out that qualitative research through a case study is the preferable way to answer the formulated research questions.

Merriam (2009) emphasizes that the design of a qualitative study is emergent and flexible and responsive to the changing conditions due the study progress. But on the other hand qualitative research methods like for instance case studies are limited, too, by the sensitivity and integrity of the investigator.

Within this thesis the aim was to discover and provide new insights and therefore the qualitative research strategy of a case study is applied. In the further description of the methodology, more detailed rationalization will be given on why using a case study.

2.2 Abductive Research Approach

Within their studies, Dubois and Gadde (2002) describe the activity of linking theory and practice as systematic combining. This research approach mainly consists of systematic combining – as it is most suitable for case studies as well. As it is described further this approach is characterized through a continuous movement between the empirical and the model world. “Systematic combining is a process where theoretical
framework, empirical fieldwork, and case analysis evolve simultaneously, and is particular useful for development of new theories.” (ibid.)

However, the abductive approach is preferred if the researcher’s objective is to discover new things (Dubois and Gadde, 2002).

As already stated also within this thesis the abductive approach is used. Regarding to Dubois and Gadde (2002) the way of systematic combining enables the researcher, to identify new things during the evolving framework which in turn might create a need to redirect the once done theoretical framework. By “going back and forth between framework, data sources, and analysis” the purpose is to match theory and reality in order to augment the theory by utilizing the empirical findings (Dubois and Gadde, 2002).

2.3 Case Study Strategy

A case study is one strategy when conducting research. Yin (2009) defines a case study as “an empirical inquiry that investigates a contemporary phenomenon within a real life context, especially when the boundaries between phenomenon and context are not clearly evident”.

Within this thesis a case study was considered to be the best alternative to answer the upcoming research questions. Yin (2009) also encourages this decision, when stating that especially for “how” and “why” questions, which are more explanatory, the use of a case study is one of the preferred research methods. According to Merriam (2009) a case study offers a means of investigating complex, social units consisting of multiple variables of potential importance in understanding the phenomenon. Therefore a case study can offer valuable insights.

However there are as well limitations when using a case study as a research method. Limitations of a case study according to Yin (2009) are a lack of rigor or the provision of a little basis for scientific generation.
Nevertheless and according to Merriam (2009), a case study is the best plan to answer research questions and its strengths are outperforming the limitations it simultaneously has.

2.4 Case Study Design

According to Yin (2009), the design of research links the collected data within the study with the occurred research questions. In further, there are four different ways to design a case study: single-case holistic, single-case embedded, multi-case holistic and multi-case embedded (Yin, 2009).

A single case study is preferable when testing the theory; hence this form of study can be used to test whether a theory scheme is right or if the theory has to be adapted. Yin (2009) emphasizes further that a single case study can even help progressing future investigations in a field of study. Multiple case studies are in general characterized by more robustness, because they incorporate multiple cases, but at the same time this is also guided by extensive research and hence is time-consuming (Yin, 2009).

Holistic case studies observe the global nature of an organization whereby embedded case studies are focusing on one or more units within an organization.

A holistic study is advantageous when no logistical subunits can be identified or the generated theory is itself of a holistic nature. In the same way this is also the limitation of a holistic case study – the conduct might be on a more abstract level characterized by a lack of clear measurements and data.

In comparison to the holistic view, the embedded view has as well its strengths and weaknesses. Focusing on subunits can, on one hand, be a good fundament for broad analysis. On the other hand, it is argued that focusing on just one subunit the risk is a shift of orientation and a change of the originally nature of a study (Yin, 2009).

Within this thesis, the case study design is based on a single-case with a holistic view. The decision focusing on a single case study is based on several aspects. One of the
strong arguments was the time limit that restricted the thesis. Another relevant aspect was that the phenomenon which has been studied is already hard to observe and, moreover, it was not that easy to get access to other companies as well.

The holistic view reflects the global nature of an organization. Within this thesis, the focus lies on SSSE as a whole and the evaluation of the insights of diverse actors within SSSE. In consideration of the disadvantage of a single-holistic case study and in order to get valuable data, all the different perspectives within the cluster of SSSE were incorporated.

2.5 Empirical Data Collection

In order to collect relevant and supportive data within a case study various strategies can be used. As it is emphasized by Yin (2009), six sources of evidence are recommended for the use of case studies. These sources include interviews, direct observations, participant observations, documentations, archival records, as well as physical artifacts. In order to build a good case study, Yin (2009) also suggested using multiple sources. Within this thesis interviews have been used as main sources of evidence in order to offer insights in the case study.

Furthermore a distinction can be made between primary and secondary data collection. Secondary data collection describes the sort of data which has been already collected by other researchers. These categories integrate books, documents, notes etc. Thus, research data is the form of data from organizations and/or institutions. On the other hand, there exists also the collection of primary data. Empirical data which is closely related with the collected research data are a form of primary data.

The data within this study has been gathered as primary and secondary data: Empirical data in form of interviews, and secondary data in form of relevant literature, journals and articles as well as published theses in the research field.
2.5.1 Interviews

According to Yin (2009) and Merriam (2009), interviews are the most important source of collecting data within qualitative research and more over are also the most often used strategy. Merriam (2009) stretches further that the most common form of interviews is the face-to-face interview. However, the main purpose of an interview is to gain a special type of information. In other words “the researcher wants to find out what is in and on someone else’s mind.” According to Merriam (2009) interviewing is also the best way when conducting intensive case studies of a few selected individuals.

In this thesis the preferred way of collecting empirical data was by doing interviews. These interviews were partly done by face-to-face, phone and email. All interviews were recorded on tape as well. As argued by Merriam (2009), this practice also ensures that everything said is sealed for analysis. Furthermore, also notes were taken during the interviews. Interviews can also be standardized, which means that all interviewed persons have to answer the same question. During this thesis the interviews were not standardized in order to realize a broad understanding. Nonetheless the interviews were conceptualized on the same base and focused on main issues.

2.5.2 Interviews with the Case Company

There were five interviews conducted to persons related to the case company with the purpose to obtain the necessary information. In the next paragraphs there is detailed information about the relevance of the interviewed persons in the project:

- Ann-Christin Bayard (ACB): Managing Director of Sustainable Sweden Southeast AB.

- William Hogland (WH): Representing Linnaeus University. Master of Science in Civil Engineering at University of Lund 1978, Doctor of Science in Civil Engineering in 1986 and Associate professor at Lund University in 1994. In 2007 he got his second professor title in Eco-Technology with focus on Innovation Systems at Mid Sweden University. William Hogland has more than 350
published reports and papers and has been the organizer of several international conferences as “Latin American – Swedish Seminar on Waste Management”, in Rio de Janeiro (1995), Brazil and “Kalmar Eco-tech”, in Kalmar (1997, 1999), Sweden (www.lnu.se).

- Ralf Hansson (RF): Representing ITT Water and Wastewater AB. He works in the Structures Finance are in the Regional Head Office in Sweden, in the Global Projects Group. This group assists all the owned companies (around 50) in their marketing and execution of projects.

- Magnus Larsson (ML): Representing WaStop International AB. Managing Director of WaStop International AB, MSc Mechanical Engineering & BSc BA, works with general management and business development in the company.

- Bo Lindholm (BL): Representing the Municipality of Kalmar. Works in the Development department at the city office. Has experience in the climate and energy in the Baltic Sea field. He gave the initiative to start the cluster of SSSE based on the idea of Green City Denmark.

The interview with ACB has been a personal, face-to-face interview as well as the interview conducted with BL. Due to the absence of WH (presently he is in Rio de Janeiro), the interview with him was based on a teleconference through Skype. The interview with RH was a telephone interview and ML was interviewed by email, sending the questionnaire in advance.

2.6 Research Quality

According to Yin (2009), there are two important requirements when it comes to the evaluation of the quality of research. These requirements are the validity and reliability of a study.

Yin (2009) further emphasizes that the design of research has to consist of a logical set of statements. Regarding to Merriam (2009) validity and reliability can be
ensured by the way of collecting, analysing and interpreting data. A discussion of the research quality will be followed in the next paragraphs, describing how the research design of this thesis is covering these main aspects with the objective of providing a reliable case study.

2.6.1 Internal Validity

When it comes to internal validity the question occurs “how congruent are the findings with reality?” (Merriam, 1995). Internal validity is mainly related to the situation of how the researcher explains “how and why” getting from X to Y (Yin, 2009).

Merriam (1995) further emphasizes that internal validity describes how findings really capture what is there. He argues that the reality is what we take to be true and that it is only relatively true. However, qualitative research assumes that reality is multidimensional constructed and ever-changing (Merriam, 1995).

Nevertheless, there are ways to strengthen the internal validity of research. One way is triangulation, which describes the use of various sources to underline findings, such as the use of multiple sources of data, multiple investigators and multiple methods.

Within this thesis multiple sources of data were used. The research data was gained through various and broad literature including relevant journals and documents to underpin the theoretical framework. The collected empirical data is conceptualized on five different sources within the cluster of SSSE including the board of SSSE, the research institution (Linnaeus University), one Municipality and two firms within the cluster.

When it comes to the use of multiple methods, it has to be said that primary interviews were the method of gaining valuable information. Observations in the common sense were not undertaken. But therefore an argument is that the cluster consists of more than thirty two actors spread around Sweden, and this fact makes it even more complex to observe the actors.
Also the criterion of multiple investigators was applied. Both authors of this thesis were involved actively in collected the empirical data. Due to the fact of having two investigators, the collected data could be discussed an evaluated in order to achieve a general perspective.

By using the concept of triangulation in two out of three cases, the internal validity of this study can be supported.

2.6.2 External Validity

External validity deals with the fact how far findings can be adapted to other situations and the question about “generalizability” occurs (Merriam, 1995). According to Yin (2009) the construction of external validity has been a major obstacle when using a case study as research strategy. Especially single case studies can be vulnerable for generalization because they present a more narrow view.

As already mentioned this thesis is based on a single case study and is therefore also more vulnerable when maintaining the external validity. Nonetheless the idea of transferring knowledge within a cluster could also be generalized and be adapted to other clusters. Beyond that, it was tried to fulfill the requirement of external validity when integrating “rich and thick” descriptions about the findings within the study (Merriam, 2009).

2.6.3 Reliability

Reliability is related to the question “which one’s findings will be found again” (Merriam, 1995). In other words it means how trustworthy the research is and if the results would be the same, if the study would be done by another researcher. Traditionally and according to Merriam (2009) reliability describes the extent to which research findings can be replicated. But what is even more important, is how consistent a study is.
The aspect of reliability is insofar difficult, because the research is always conducted by human beings. And human behavior is “never static”. Hence several interpretations of a study could be made, dependently on the person and also the environment itself as it is also underlay changes. Merriam (2009) further stretches that due to the non-static behavior of people the probability of the same results is more coincidental.

However, the aim of reliability is to reduce the risk of errors and the degree of subjectivity. In further accordance to Merriam (2009) the question is therefore more how consistent are the results with the collected data.

There are also various ways of strengthen the requirement of reliability. Yin (2009) therefore emphasizes to document every single step of the research and make them as operational as possible. The researcher should always assume when conducting data “as if someone always looking over your shoulder.” Within this thesis all data were collected and stored carefully. All interviews were recorded, beyond that several notes exist, which are describing the main steps and procedures undertaken for the research of the study.

Additionally it can be said again, that also here, triangulation is a good way to achieve reliability. Hence also the use of multiple sources and multiple investigators supports the consistency of the current study.
3 Theoretical Framework

Chapter three explains the theoretical framework used for this study. It starts with an explanation of the cluster concept, followed by the topic of knowledge. Within the knowledge concept, knowledge management and knowledge transfer are explained, as well as the barriers in the transfer of knowledge. After that, relationship building is mentioned and how relationships can be built and what motivates to build them. Finally the theoretical summary is presented.

3.1 Clusters

Porter (1998) defines clusters as “…geographic concentrations of interconnected companies and institutions in a particular field”. The products and/or services offered by this group of organizations are related to the same field or industry (Ketels, 2003). Clusters can also facilitate the emergence of new business, as new needs can be discovered after the interaction of the actors and when insights are shared (Porter, 1998).

A cluster encourages the cooperation and competition from its actors. As it is said before, the actors of a cluster are within a common industry, and it is possible that they compete with each other outside the cluster or that the fact of being inside the cluster facilitates the measure and comparison of performances, because they share some circumstances. However, cooperation exists between the actors when it is for the sake of the cluster (Porter, 1998).

The fact of being co-located in a specific region and the relatedness of their activities, allows the organizations that are part of a cluster to have certain advantages, such as: knowledge sharing and the opportunity to learn from others due to the close interaction (Ketels, 2003). Another important advantage is that by being part of a cluster, an actor can react rapidly to certain situations, thanks to the support of the other actors of the cluster and the possibility of sharing risks and resources (Porter, 1998).
3.2 Knowledge

Recently there is an enduring interest within the topic of knowledge. Knowledge is therefore a term which is ever present in various literatures – starting from the philosophical to the management literature. Especially regarding to the management discussion knowledge is perceived in a variety of ways (Bukh et al., 2005). Due to this fact one possible definition of knowledge will be suggested in the following paragraph.

3.2.1 Knowledge Definition

While knowledge is highly complex it is not easy to find a precise definition within the literature, especially for the reason that the term of knowledge is used in different contexts’. According to Nonaka and Teece (2001), knowledge is intangible, dynamic and context specific; it requires a context in order to have a meaning, otherwise it is only information. They emphasize further that individuals can interpret information and translate it into knowledge by giving it certain context and beliefs and that knowledge is created during social interactions of individuals and organizations.

3.2.2 Types of Knowledge

There are two types of knowledge: tacit and explicit knowledge. Tacit knowledge comprises ideals, values and emotions. It is highly personal and is be difficult to share with other individuals. The second one, the explicit knowledge, can be shared in form of data, specifications or manuals and is transferred through words or numbers (Nonaka and Konno, 1998).

However Robert Grant (2010) makes an interesting distinction regarding knowledge, between knowing how and knowing about. Know how relates to skills and performances and is therefore primarily tacit knowledge. Knowing about includes theories and facts and is by contrast mainly explicit knowledge. For the purpose of this theoretical framework, the main focus lies on the form of explicit knowledge.

Due to the fact that explicit knowledge can be systematically and formally communicated among individuals, and is shared in the form of data and specifications, the
transfer is considered to be relatively easy, compared to the transfer of tacit knowledge (Nonaka and Teece, 2001). Explicit knowledge is replicable, because once it is created it can be transferred from the source to other receivers. Grant (2010) therefore characterized it as “public good”.

3.3 Knowledge Management

Knowledge management is as well an often discussed topic within the management literature (Nonaka & Konno, 1998). Particularly the issue of how knowledge can be managed in order to become advantageous for an organization is frequently argued (Alavi & Leidner, 2001).

3.3.1 Definition of Knowledge Management

Likewise as with the general term of knowledge there is also no common agreement about a definition according to knowledge management. Although, the term of management implies to some extend that knowledge can be managed.

However Nonaka and Konno (1998) for instance define knowledge management as a key task in making knowledge available for an organization. Referring to this definition Alavi and Leitner (2001) elaborate that knowledge management is about the identification and leverage of knowledge per se in order to support an organization in its performance.

3.3.2 Knowledge Management Process

In general, knowledge management can be seen as a process which consists of four major steps:

*Creating, Sharing, Protecting and Discarding* (Ichijo & Nonaka, 2007).

The activity of *creating* is about how an organization can stimulate the process of knowledge creation and motivate the employees to participate (Ichijo & Nonaka, 2007).

The next step is the act of *sharing* knowledge. This step is overall important otherwise the best gained knowledge is useless when it cannot be transferred and
therefore not shared within various units and business functions of an organization (Ichijo & Nonaka, 2007).

*Protecting* is the third step and is needed to avoid that the once created knowledge can easily be used by competitors. The last step of *discarding* knowledge is necessary in order to find out if the generated knowledge is still relevant or already outdated (Ichijo & Nonaka, 2007).

In this thesis the focus is based on the transfer process of knowledge, hence the activity of *sharing*. Moreover it’s about *sharing* knowledge internally in a cluster.

### 3.4 Knowledge Transfer

As already mentioned, knowledge can be divided in explicit and tacit knowledge. By explanation, the explicit knowledge is much easier to transfer than the tacit knowledge, especially due to the reason that the tacit one is often complex to communicate and remains in local business areas instead of widespread (Ichijo and Nonaka, 2007).

#### 3.4.1 Definition of Knowledge Transfer

The process of moving knowledge across different organizational areas to provide competitive advantage throughout an organization is called knowledge transfer (Ichijo & Nonaka, 2007).

Knowledge transfer is ever-present within an organization, and the actors involved can change roles in order of being whether the source or the receiver of knowledge. The transfer can be hold up by the knowledge itself; the more explicit it is, the less complex it is to communicate. Also the physical proximity of the source and the receiver assists the transfer. Even though nowadays there is a technology advance and people can use diverse media to transfer knowledge, trust among the actors is nevertheless essential. Trust can be developed by building strong relationships and in turn facilitates the transfer of knowledge (Ichijo and Nonaka, 2007).
3.4.2 Modes of Knowledge Transfer

Figure 1 shows the modes of knowledge transfer and the distinction between them, regarding passive reception or active learning.

![Diagram of Modes of Knowledge Transfer]

At the bottom of the arrow there are specific directions, presentations (e.g. PowerPoint slides) or lectures, which relate more to a passive reception from the receivers (Ichijo and Nonaka, 2007). These activities are performed by the source in order to transfer the knowledge to the receiver.

Then there are the rules of thumb, which is a term that is used in directing to action and decision making in situations where there should be a focus on what is important. An exception for this concept is the fact that only experienced individuals are the ones who decide if a rule of thumb applies or not (Ichijo and Nonaka, 2007).

A persuasive technique used by knowledge sources is storytelling, as it can be helpful in developing the context for knowledge. According to Ichijo and Nonaka (2007), storytelling is an efficient tool because narrative engages, entertains and could relate to personal experiences which makes it easier for the receiver to store the gained knowledge.
Socratic questioning is a sort of reflection about actions and decisions taken. This reflection helps in developing active learning processes among actors. By questioning the decisions taken, the causes of the action can be evaluated. The key word in this process is “why?” (Ichijo and Nonaka, 2007).

The guided experience is conducted by an expert guide through situations where the individual should be advised by the expert (source) regarding certain needed knowledge (“sink or swim” method – sending an individual to a new situation). There are three types of guided experience which require knowledge from a superior: practice, observation and problem-solving (Ichijo and Nonaka, 2007).

*Practice* refers when the expert provides feedback to the receiver of the knowledge. In that case, the receiver will be able to do the activity again after having a review. Providing feedback is a way to allow the identification of opportunity areas in the activity that are performed (Ichijo and Nonaka, 2007).

*Observation* is about being with someone in order to learn what the person does in action. It is important that the observation is followed by a talk to analyze what was seen (Ichijo and Nonaka, 2007).

*Problem-solving* also involves observation, but there is more involvement from the receiver in order to perform certain activities. The expert (source) allows the receiver to make his own decisions and approach the problem (Ichijo and Nonaka, 2007).

A transfer is considered to be successful when the once transferred knowledge is employed and internalized (Ichijo and Nonaka, 2007). In other words the knowledge becomes part of the routines, hence transformed in a taken for granted status, and acquire certain values for the receiver (Szulanski, 1996).
3.4.3 Actors within the Knowledge Transfer

Considering the fact that knowledge transfer is a complex process within organizations and mainly influenced by the structure of an organization, especially the involved parties have to put in light (Bukh et al., 2005).

In order to transfer the once created and existing knowledge, platforms are needed where knowledge can emerge. Nonetheless a platform is not enough. A transferring process contains as already mentioned always through a source and a receiver. In particular the source plays an overall important role in transferring knowledge. Nonaka uses the term of “knowledge activist” in his studies and points it out as a decisive part within a transaction. According to Nonaka (1998) knowledge activists are described as catalysts which manage and support knowledge within an organization.

Considering the importance and strong role of the source within the transferring act those knowledge activists has to be identified. But how is it possible to identify these main actors?

In the research of Allen (1977) these key actors are called gatekeepers (Morrison, A., 2008). To transfer knowledge, this special group of actors is responsible to identify other relevant participating actors within the process of transferring. Therefore gatekeepers can also be seen as knowledge transmitter, especially when it comes to the point of transferring external knowledge into an organization.

Morrison (2008) describes gatekeepers by the following features:

- Constitute of a small community of individuals.
- Core of an information network.
- Overexposed to external sources of information.
- Linkages with external actors are often informal (Morrison, A., 2008).
The notion of gatekeepers is important, because this group of actors can be used as a catalyst to translate and visualize knowledge for others within an organization. In other words it can be said that gatekeepers have a “transcoding function” for those actors who cannot interact with external sources of knowledge (ibid.). Thus gatekeepers performing an overall essential role within knowledge transfer and can be seen as link between the external environment and the organization.

The interaction with external sources also requires most of all relationship capital. Relationship capital is characterized by the ability to interact in various networks with different actors and is a necessary variable for being a gatekeeper. Beyond that gatekeepers also have a high degree of interconnectivity (ibid.).

To sum up, gatekeepers identify relevant knowledge from external sources, absorb, interpret and translate it in an understandable context. Considering these facts gatekeepers are actors which are well acquainted in dealing with external sources as well as other actors among. In addition to it in particular the ability of creating and interacting in relationships is an overall important role to fulfill by gatekeepers – the knowledge sources.

3.4.4 Barriers of Knowledge Transfer

According to Szulanski (1996), there are four factors that have an impact on the transfer of knowledge. These factors refer to the characteristics of the knowledge that is being transferred, characteristics of the source, characteristics of the recipient and the transfer context.

Casual ambiguity is a characteristic of the knowledge that is being transferred, and it is present when the reasons for certain success or failure are unknown. Unprovenness is another characteristic of the knowledge transferred and it is about the ability of certain knowledge to be proved of usefulness. If knowledge has been useful in past experiences and there is a proof of that, then the transfer will be less complicated (Szulanski, 1996).
Lack of motivation and reliability are two important characteristics of the source of knowledge. The first one refers to the unwillingness of the source to share the knowledge because it may think that it could lose certain rights on that knowledge, or that it will not have a proper reward after the sharing. Sometimes there is a lack of motivation to invest resources that are needed for the transfer. The second characteristic relates to the difficulty in the transfer, when the source is not seen as trustworthy or with the needed knowledge by the other actors. There is more resistance from the other actors when they do not trust in the source of the knowledge. If the recipients trust in the source, the source can have an influence on them that could support the transfer (Szulanski, 1996).

Also, within the characteristics of the recipient, lack of motivation can be found. In this case it is about the unwillingness of the recipient to accept the transferred knowledge (Szulanski, 1996).

There are two characteristics of the context: barren organizational context and arduous relationship. The first one differentiates the organizational context by naming it fertile or barren. When the context helps the transfer of knowledge, it is fertile. When the context obstacles the development of transfers, it is barren. Having coordination, expertise and formal structures and systems within the organization could influence the number of times that the transfer is tried. The second characteristic, arduous relationship, helps explaining the importance of communication and the degree of the relationships between the actors. During a transfer, there is a need to have a good communication and a good relationship within the source and the recipient. If the relationship is arduous or distant, then it could have an influence on the transfer (Szulanski, 1996).

3.5 Relationship Building

In accordance to Grönroos (1994) relationship building and management is described as a cornerstone within marketing. Since relationships are in general complex and multi-dimensional, a strong relationship can become a bridge and is able to reduce complexity.
However and in addition to it the focus often lays on building external relationships. But before building strong and long-term relationships with external customers, the internal point of view should not be underestimated. In the research of Cann (1998) this approach is also supported. Moreover it is suggested to focus internally by defining a cooperate strategy and having a shared goal before concentrating on the external environment.

3.5.1 Definition of Relationship Building

Relationship building and management are part of relationship marketing – a progressive approach of marketing strategy (Wang et al., 2000). According to Gemünden, Ritter and Walter (2005) relationship marketing is “marketing seen as relationships, networks (networks arise and grow as a result of interactions) and interactions”.

Partially and regarding to the impact of internal relationships within the literature (Berry 1995; Grönroos 1994; Canne 2001) the term of a new paradigm is even used. Grönroos (1994) even goes one step further: “If internal marketing is neglected, external marketing suffers or fails.” That underlines in turn the relevance of considering the internal perspective of relationship building.

3.5.2 Relationship Building Process

As already stated above is relationship building a part of the field of relationship marketing. The relationship building process then refers to the activities of establishing, developing and maintaining successful relational exchanges (Bush, Underwood III and Sherrell, 2007). The objective of these three steps (establish, develop and maintain) is to foment long term relationships characterized by collaboration and commitment from the involved actors through shared routines and objectives (Andersen, 2001).

If a relationship should be long-term based and guided by collaboration a common understanding from the actors of the benefits of being part of it is needed. In other words, the actors need to know that they can gain advantages by developing and maintaining certain relationships (Gummerson, 2002).
3.5.3 Relationship Building Motivators

As it is defined by Grönroos (1994) “…marketing is to establish, maintain, and enhance relationships with customers and other partners, at a profit, so that the objectives of the parties involved are met. This is achieved by a mutual exchange and fulfillment of promises.”

Regarding to Gemünden et al. (2005) the management of relationships can be seen as a dynamic bundle of tasks. Relationships enable the actors to achieve goals which they only can achieve together. Hence an effective relationship is characterized by “the extent of goal attainment”.

Moreover the development and treatment of good relationships is a key essence to reduce uncertainty and increase commitment to finally create a good communication flow between different units when routines are shared.

However crucial is, that the transfer of knowledge can be supported and pushed when creating an appropriate environment. Also the approach that knowledge not only can flow in one cluster, instead dynamic clusters share knowledge also within other clusters, needs strong relationships (Wolfe and Gertler, 2003).

In this context it can be referred to Morgan and Hunt who are claiming that key elements of successful relationships are: trust, commitment and reciprocity (Bush et al., 2007)

*Trust* is a phenomenon that is discussed through the sociology literature to the literature of economy (Papadopoulou et al., 2001). This emphasizes also the importance of this small word which has a lot of meanings and is generally seen as a crucial factor for successful relationships (Garbarino and Johnson, 1999). One definition of trust is “…the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.”(Mayer et al., 1995)
By trust it is possible to overcome uncertainty and vulnerability, because trust reflects also the reliance of a partner. Especially in organization where working often is combined with dependency on other partners or units to accomplish goals, trust is an overall important variable that has a strong impact on this kind of exchange situation.

In particular in the area of relationship building, trust can be a success factor. According to Luhmann (1979) trust is also a tool that can reduce the complexity.

Moreover trust is essential in the knowledge transfer as it helps improving the relationships among them and facilitates the communication (Wilson and Spoehr, 2009). In consideration, this trust can be an overall important enabler for building and improving relationships.

As it is stated by Jan Carlson of SAS “...only committed and informed people perform.” (Grönroos, 1994).

To come back to the statement of Morgan and Hunt (1994) they highlight commitment as another key factor for successful and long-term based relationships. Commitment in general describes the psychological attachment of individuals (Garbarino and Johnson, 1999). Within the marketing research it is pointed out that mutual commitment per se provides a lot of benefits to an organization. One of those benefits can be for instance an improved product and service development. Affective commitment is classified as the most desirable form of commitment within a relationship. It is characterized by an emotional attachment. Moreover it is about sharing and identifying with the values of an organization and has a strong impact on:

- The intension to stay in a relationship.
- Performance and willingness to invest in a relationship (Wetzels et al., 1998).

According to Kogut (1989) reciprocity is the potential to reward and penalize behavior among transacting parties and is fundamental for the achievement of long-term cooperation.
Keohane (1986) continued that “reciprocity refers to exchanges of roughly equivalent values in which the actions of each party are contingent on the prior actions of the others in such a way that good is returned for good, and bad for bad. These exchanges are often, but not necessarily, mutually beneficial; they may be based on self-interest as well as on shared concept of rights and obligations; and the value of what is exchanged may or may not be comparable” (Keohane, 1986).

The exchange of information and hence knowledge is then greatly dependent on if there is a fair return on sharing and a clear value for seeking it (Beardsley et al., 2006).

Along the process of building a relationship, there are two main requisites that should exist: Reciprocal empathy and reciprocal vulnerability. The first one is when an actor identifies and understands the situation of the other actor. The second one refers to the situation when the two actors feel comfortable and safe towards the flow of knowledge, and this can be in turn an enabler for trust (Wolfe, 1998).

The law of reciprocity can therefore have a positive influence on the coordination of mutual actions within relationships. They are based on the exchange of benefits given and taken by the involved actors and will continue as long as there is a balance within its activities – a relationship equity (Bush et al, 2007).

According to Cann (1998), social bonding is an outgrowth of personal relationships between different parties of an organization. Beyond that, it is said that the better the personal fit between the actors is, the stronger are the social bonds. Within the approach of social bonding one keyword for instance is familiarize. By implication to familiarize trust again is needed. In closing a lack of knowledge can be bridged by trust and strong social bonding of the involved actors.

3.6 Theoretical Summary

The first sub research question is related to the barriers that are faced when knowledge is transferred within a cluster.
Referring to the above constructed theoretical framework, knowledge transfer is an overall complex process.

According to the deduced theory, four main factors have a strong impact on the transfer of knowledge: the characteristics of the knowledge transferred, the characteristics of the source of knowledge, the characteristics of the recipient of knowledge and the characteristics of the context.

In the first case, the unprovenness of the knowledge plays an important barrier. If the knowledge has been transferred and been useful before, then the next transfer can be less complex.

Secondly, within the characteristics of the source of knowledge reliability can also hinder knowledge transfer. The source of knowledge has to be perceived as reliable by the receiver of knowledge. Also, a lack of motivation which refers to the unwillingness of the source to share the knowledge can be another obstacle within the transfer. Reasons for that could for example be that the purpose of sharing knowledge is unknown, often additional guided by uncertainty and lacking trustworthiness.

Lack of motivation is also part of the characteristics of the recipient of knowledge. It can be a barrier for the transfer of knowledge when the source is not willing to accept the knowledge from the source.

A barren organizational context is part of the characteristics of the context. It refers to the capacity of the context to allow the transfer. When a context facilitates the transfer of knowledge it is considered to be fertile, and when it does not support the transfer it is considered to be barren. Arduous relationships are another characteristic of the context and it refers to the degree of the relationship between the source and the receiver. If there is a stronger relationship, the transfer of knowledge can be less difficult.

The second research sub question relates to the role that the actors of a cluster play during the transfer of knowledge?
Clusters consist of various actors and can be characterized as dynamic since the actors within can change over a period of time. In general, clusters often consist through various organizations from small to large, often also universities or at least diverse research institutions and municipalities. As already explained within the theory, all these actors may have different point of views and different ways of solving problems.

However, when it comes to knowledge transfer the source and receiver concept can be used to explain the activity of transferring. The source has the demanding task to identify and beyond that also codify knowledge for the receiver. A transfer can be seen as successful when the receiver, as the recipient of knowledge, is able to use the transferred knowledge afterwards.

The actors known as gatekeepers play an overall important role and have to be identified within a cluster. According to the theory, gatekeepers perform the role of a knowledge filter or catalyst. Due to their relationship capital they are able to build a valuable alliance between an organization and the external environment. Furthermore, gatekeepers are characterized by a very good communication performance and by having the ability to codify knowledge and spread it in an organization.

The third research sub question deals with how the actors of a cluster can build long-term relationships among them and what could motivate this process?

The relationship building process consists through three main steps: Establishing, Developing and Maintaining. When establishing or building relationships there are certain aspects guiding the process. Normally a relationship exists already when there is an exchange between at least two different parties. But in order to build long-term relationships various enablers or drivers are needed. Trust, commitment, reciprocity, social bonding and high transparency within the communication flow are such variables which can be stated as enabler for the building process of long-term internal relationships.
The main research question concerns how knowledge can be transferred within a cluster.

The transfer of knowledge is influenced by a variety of factors. Especially due to the fact that a cluster consists through a mixture of actors with different backgrounds, strong relationships between them are considered to be supportive when transferring knowledge. The transfer of knowledge can be answered by explaining the roles that the actors play within the process. There is a source of the knowledge and a receiver, having a gatekeeper in between by filtering the knowledge.

The modes of transfer can help explaining the different options used to transfer knowledge, depending on how explicit the knowledge is, in order to know what the most convenient mode to use; starting from giving specific directions or documents until a “learning by doing” experience.
4 Empirical Findings

Chapter four presents the empirical data collected during the interviews to: Ann‐Christin Bayard (ACB) from SSSE AB, William Hogland (WH) from Linnaeus University, Ralf Hansson (RH) from ITT Water and Wastewater AB, Magnus Larsson (ML) from WaStop AB and Bo Lindholm (BL) from the Municipality of Kalmar. The data obtained from these interviews and SSSE’s website is divided into several categories that will help answering the research questions of this study.

4.1 Sustainable Sweden Southeast AB (SSSE)

Sustainable Sweden Southeast AB (SSSE) was established in 2001 through the initiative from Companies, Municipality of Kalmar, the Regional County Council and with the support from the University of Kalmar. It is a cluster focused on offering sustainable business solutions though high quality equipment and technology in areas like: environmental management, renewable energy solutions, water management, recycling and waste management, sustainable building and urban planning and clean production (http://www.sustainable-sweden.se).

The cluster is integrated by thirty two organizations, from which ten are Municipalities and the rest are Companies and Universities. There is a board conformed by one representative of every actor within the cluster: Shareholder Company, University, Municipality and Associated Company. This board meets five times a year and makes important decisions regarding the development of the cluster and the actors. The main requirement that an organization should fulfill in order to become part of the cluster is that it is related to Environmental Sustainability (ACB, 13-05-10).
SSSE’s actors:

![Figure 2: Actors within SSSE. Source: based on (http://www.sustainable-sweden.se) and own elaboration.](image)

SSSE’s objective is to offer an integral supply of environmental technology to potential clients, with the support of knowledge and experience transfer. The cluster coordinates business relations between Swedish and International Organizations that are related to sustainable areas. Some of the projects that SSSE has participated in so far are: Energy Efficiency in Nybro, Kaliningrad Landfill Gas, District Hospital in Poland, River Nevezis Feasibility Study and Green City Can Tho in Vietnam.

These are some of the projects that the cluster is working in: Environmental Technology for the Polish Market, Stinno - Sustainable Innovations and Treatment in Industrial Waste Water and Sustainable Healthcare
4.1.1 SSSE’s Strengths

According to the interviews performed, the main driver to become part of SSSE is the networking opportunity. The actors of the cluster are able to get to know each other and share knowledge and experiences. Also through this networking, there are opportunities for business growth through new projects.

Another point of view lies in a societal perspective, like WH (09-05-10) said: “... it creates projects that could be useful for the society and can improve the quality of life”.

According to RH (10-05-10), SSSE’s vision in sustainability is focused. SSSE offers an integral solution in sustainability, due to the variety of organizations that are part of the cluster. WH (09-05-10) mentioned that the different skills and backgrounds of the actors of the cluster are an important strength.

Also, the fact of working in the sustainable field allows the cluster and its actors to create a good image and reputation in the society (WH, 09-05-10).

4.1.2 SSSE’s Weaknesses

An important weakness discovered during the interviews is that there is a need to clarify SSSE’s objective and the benefit to its actors. WH said “the benefits that we can have of working together have never been analyzed and a strategy on how we shall work together in a more beneficial way has not been studied or discussed” (09-05-10).

Another weakness is the lack of cooperation between the actors to work together. This relates to the first weakness, as there is no understanding in the benefit of certain activities in the cluster (WH, 09-05-10).

The financial situation is also an issue. There is a need for financial support maybe from the public sector. Right now the support comes from the actors of the cluster and some projects (BL, 17-05-10).
Some of the actors of the cluster need to develop skills in order to be able to work in International markets, such as: language skills (WH, 09-05-10).

4.2 Knowledge Transfer Process

Linnaeus University plays an important role supporting SSSE with knowledge regarding sustainability and promoting cooperation among the actors. WH’s interaction within the cluster is mostly with Ann-Christin Bayard. The tools used for the transfer of knowledge are telephone, e-mail, meetings (media conference) and scientific papers (WH, 09-05-10).

The Municipality, represented by Bo Lindholm also provides knowledge and experience in sustainability and project development. The initiatives of new business or ideas sometimes are started by him. Most of the contact within the cluster is also with Ann-Christin Bayard but if it is necessary there is also direct contact with some of the actors in order to propose new initiatives (BL, 17-05-10).

Companies (Multinational or Small-Medium sized) are part of the network but more as a receptor of knowledge (ML, 13-05-10). RH (10-05-10) stated: “Mainly a receiver, most of the initiatives come from SSSE”. The companies’ interactions with SSSE are mostly with ACB. Some of the knowledge shared in the network relates more to business contacts and experiences (ML, 13-05-10).

SSSE, represented by ACB works as an intermediary coordinator and filter of the knowledge provided from the University, Municipalities and SSSE itself, in order to transfer the knowledge to the actors and foment collaboration. The communication is though phone calls, newsletters, SSSE’s homepage, e-mails and meetings (ACB, 13-05-10).

4.3 Knowledge Transfer Barriers

ACB (13-05-10) says that the knowledge transfer process sometimes is not efficient due to a lack of flexibility, time and disposition from the actors of the cluster.
Also, some companies that are actors of the cluster still need to understand the benefit of working together with other companies. WH (09-05-10) said: “…companies still see us as consultants but must work together for coproduction both in research, teaching and technical/practical issues”.

4.4 Business Relationships in SSSE

According to the interviews performed, all agree on the importance of relationships within the cluster. ACB (13-05-10) identified relationship building as a priority but she said that relationships strength goes up and down. If there is a project the relationships among the involved organizations are strong (sometimes the actors visit other actors in order to acquire certain knowledge), but after the project is finished the relationships stay at an average level. SSSE focuses on having a good communication with the actors through phone calls, e-mails, newsletters, homepage information and organizing meetings (ACB, 13-05-10).

ML (13-05-10) commented that relationships should be even stronger in companies that are related to the same business.

RH (10-05-10) said that the relationship with ACB is strong, but referring to the other actors of the cluster he mentioned that he does not know all of them as there has not been a reason to interact with them yet.

BL (17-05-10) classified the actual relationships within the cluster as good enough. He explains that if the relationships were not good enough then the actors would not agree to still be part of the cluster.

4.5 Business Relationships Motivators

According to BL (17-05-10), there is a need to have a shared understanding of the process that the cluster follows in order to provide new business ideas and initiatives. If companies understand the importance of cooperation through different stages in the process of generating ideas, it will help in building stronger relationships.
ML (13-05-10) stated that a motivator to build business relationships among the cluster is to have a common wish and strategy to develop a business and be open minded to outer inputs. Companies should have the willingness to share knowledge with others.

WH (09-05-10) said that chemistry between the individuals is important to build business relationships. Having meetings and workshops could be a motivator to companies to interact more. Also, being able to get more research programs and produce patents together and sell those patents internationally could help building strong relationships among the actors of the cluster (knowledge protection). There should be a common interest from the actors in order to build a relationship.

RH (10-05-10) mentioned that trust can be built when people meet occasionally. If a company participates it is easier to build trust.

From SSSE’s perspective, the actors should be more communicative towards the cluster. If the actors explain their expectations of the cluster and what it can do for them, then there will be a better understanding of their needs. Cooperation is important in order to build business relationships in the cluster. (ACB, 13-05-10).

4.6 Business Relationships Barriers

In certain occasions, the competitive situation in the market could be an obstacle for the actors to build business relationships among them (ML, 13-05-10).

The actors of the cluster sometimes desire to have just the knowledge needed, but without building a relationship. They want to see the result or benefit of the cluster in a short time. Also there could be differences among the actors that could be a barrier for the relationship building, such as: use of different terms during certain meetings that not all the actors can understand and paying more respect to certain organizations (ACB, 13-05-10).

The fact that companies do not know how to communicate and to work together is an issue that could be a barrier for building a relationship among them (WH, 09-05-10).
It is important to know all the actors of the cluster and really understand the benefit of being part of it in order to build a business relationship (BL, 17-05-10).

4.7 Empirical Summary

In the next paragraphs there is a summary of the empirical findings of the study. Empirical inputs of the information gathered during the interviews will be explained for the main research question and the research sub questions in order to answer them in the next paragraphs.

The first research sub question relates to the barriers that are faced during the transfer of knowledge. Regarding the information obtained in the interviews, the next facts serve as inputs for answering this research question:

- Some of the actors of the cluster are not flexible enough and do not have the necessary time and disposition to exchange knowledge.

- Also, the fact of not understanding the benefit of working together could be a barrier. The actors of a cluster need to comprehend all the benefits of working together towards a common goal.

The second research sub question relates to the role that the actors within the cluster play during the transfer of knowledge. Regarding the information obtained in the interviews, the next facts serve as inputs for answering this research question:

- SSSE is the key link within the transfer of knowledge; the cluster works as an intermediary between the actors. The knowledge that will be sent is reviewed by the cluster (represented by ACB) and the modes of transfer that will be used.

- The strongest relationship that exists within the actors is with the cluster itself, as it serves as a link among them and a filter for the knowledge that comes from the sources.
- Universities and Municipalities serve as a source of the knowledge, where SSSE is in turn the filter of that knowledge. Companies within the cluster are the receivers of the knowledge.

  The third research sub question relates to how the actors of a cluster can build long-term relationships among them and what could motivate this process. Regarding the information obtained in the interviews, the next facts serve as inputs for answering this research question:

  - SSSE makes efforts in improving the communication with its actors by keeping them informed about projects and any other news about the cluster through the use of e-mail, newsletter, homepage information phone calls and meetings.

  - Relationships grow when there is a project running, but after it is finished, the relationship level tends to decrease.

  - All the actors of the cluster should understand the objective of the cluster and see the benefit for them in such objective.

  - It is important to be open-minded to outer inputs from the other actors of the cluster.

  - There should be chemistry between the individuals, and this could be developed by having more opportunities to socialize with the other actors.

  - Trust can be developed by meetings and participation within the cluster. Trust is an important enabler for building relationships.

  - There is also a need to obtain input from the actors of the cluster. They should communicate their expectations of the cluster to SSSE, so that the cluster can focus on fulfilling those needs and foment collaboration.
The competitive situation of the market is a barrier for the relationship building, as sometimes companies can seek for its own benefit first, instead of cooperating within the cluster.

Some actors may share some common background and leave others in disadvantage on the relationship building.

Some actors seek to have a fast result from the cluster and are focused in having just the necessary knowledge without that much interaction with other actors.

The main research question relates to how knowledge can be transferred within a cluster. Regarding the information obtained in the interviews, the next facts serve as inputs for answering this research question:

SSSE transfers knowledge to the actors through e-mail, newsletter, SSSE’s homepage and organizes meetings.

The Universities and Municipalities are a backup for SSSE in the generation of ideas and initiatives, while other organizations that are actors just receive the knowledge from the cluster.

The receivers within the knowledge transfer process recognize that some of the knowledge that they acquire from the cluster is an important amount of business contacts and also the opportunity to learn from the experience of others.
5 Analysis

Chapter five provides an analysis of the empirical data based on the case study of SSSE. The empirical findings are linked to the theoretical framework in order to realize a systematic combining approach which describes the movement between theoretical and empirical fieldwork. Throughout the following chapter SSSE should be set as one example of a cluster, nevertheless other clusters may be subjected to different issues.

5.1 Knowledge in SSSE

According to Nonaka and Teece (2001), knowledge is created during social interactions. In the case of SSSE, knowledge is created through the interaction of some of its actors and then it is transferred to others within the cluster.

As stated before in this study, there are two types of knowledge: tacit and explicit. Within SSSE, the knowledge that will be analyzed is explicit and it concerns the industry of sustainability and new projects opportunities for business development. It is transferred in the form of data though words and numbers in reports, articles and newsletters. The knowledge within SSSE can be distinguished as “knowing about”, like Robert Grant (2010) stated this concept, which is mainly explicit knowledge with theories and facts. Nevertheless, SSSE also transfers certain knowledge that is considered as “know how”, related to skills and performances and it is tacit. The actors within the cluster are able to learn from others regarding certain “know how” skills in the field.

5.2 Knowledge Management Process in SSSE

Knowledge management is an important activity where knowledge becomes available within an organization (Nonaka and Konno, 1998). SSSE applies knowledge management though its actors. ACB, representing SSSE, is the person in charge of managing the knowledge across the actors of the cluster by coordinating and organizing the activities needed for the transfer.
Knowledge management consists of four stages: *Creating, Sharing, Protecting and Discarding* (Ichijo and Nonaka, 2007). As stated in the Theoretical Framework in Chapter two, for the purpose of this study the stage that will be analyzed is the second one – *Sharing*. The stage of knowledge sharing is important as it refers to the distribution of the knowledge across the actors of an organization (Ichijo and Nonaka, 2007).

In SSSE the knowledge is shared among its actors in order to improve the generation of ideas and the overall performance of the cluster.

### 5.3 Knowledge Transfer

Knowledge transfer consists of moving knowledge across different areas of an organization in order to make an organization more competitive.

The actors involved in the process of knowledge transfer can change their roles - sometimes they can be the source and in other occasions the receiver of knowledge. The more explicit knowledge is, the easier it is to transfer (Ichijo and Nonaka, 2007).

In SSSE there are two main sources of knowledge: Linnaeus University and in some occasions the Municipalities, supporting ACB with initiatives. In contrast, the Companies within the cluster are playing the role of the receiver in the transfer of knowledge. Moreover, the knowledge transferred in the cluster is mostly explicit. In other words, the knowledge which is shared among the cluster actors is in form of data (minutes or reports for instance) or the online-presence of SSSE.
5.3.1 Modes of Knowledge Transfer

![Modes of Knowledge Transfer in SSSE](image)

The first activity, from bottom to top, relates to the source in giving specific directions, presentations or lectures to the receiver (Ichijo and Nonaka, 2007). SSSE performs this activity by transmitting certain knowledge when sending it through e-mails, communicating it by phone calls or during meetings to the receivers, hence its actors.

The guided experience relates to the fact when an actor is advised by an expert regarding certain lack of knowledge (Ichijo and Nonaka, 2007).

SSSE applies this mode of transfer through observation. Some companies visit other companies within the cluster in order to acquire certain knowledge in the field of sustainability, especially when there are special projects running for SSSE.

As the activities go higher in the arrow level, the knowledge to be transferred demands active learning, because the actors react to the actions. In a lower degree in the arrow, the reception of the knowledge is rather passive. For example, when SSSE sends certain information by e-mail, the receiver simply obtains it, thus there is no need for an active reaction.
5.3.2 Actors within the Knowledge Transfer

Gatekeepers can be named as one of the most important actors within the process of knowledge transfer. These actors are characterized by a high interconnectivity which is expressed by excellent connections within the internal organization as well as with the external environment. They are performing a role which can be described as knowledge catalyst. This is further underlined by the fact that they represent the core within an information network.

SSSE works as an intermediary coordinator (operates like an umbrella) guided by ACB in order to enhance cooperation and originate new projects. The cluster coordinates the projects and also looks for appropriate actors within which are able to work on upcoming projects and requests. SSSE links the external environment of the cluster with the intra-organization in order to perform the clusters objective of offering an integral supply of environmental technology.

Universities play the role of sources of the knowledge and some Municipalities support this role also by promoting certain initiatives. As stated before, SSSE plays the role of a gatekeeper, filtering the knowledge coming from the source (Universities and Municipalities) and then transferring it to the receivers. The receiver role is played by the companies that are part of the cluster and also some Municipalities.

5.3.3 Barriers in Knowledge Transfer

Lack of motivation is a barrier for the transfer of knowledge that can be analyzed in two ways. First, it relates to the reluctance of a source to share knowledge with others. Also, there is the point of view from the perspective of the receiver, where it is unwilling to receive the knowledge from the source (Szulanski, 1996).

It can be said, that there is a lack of motivation outgoing from the receivers perspective. This applies especially in cases where no benefit of shared knowledge can be identified. Beyond that, the receivers sometimes do not understand the advantages or
benefits of being part of the cluster and that in turn diminishes the willingness to transfer the knowledge to other actors.

Reliability is another important barrier which has to do with the trust that prevails within the cluster. If there is a lack of trust on behalf of the receiver in the source, it is possible that there is no trust in the value of the transferred knowledge as well (Szulanski, 1996).

In SSSE there is certain reluctance to share knowledge because the actors have not been able to meet and get to know all the organizations that are part of the cluster. The fact of not being able to meet can be seen as a barrier for building trust among them, thus the transfer of knowledge is affected.

The context where the transfer takes place is important to analyze in order to know if it is barren or fertile. The term barren describes the situation, when the context does not support the transfer of knowledge and fertile is the opposite – it enables the transfer (Szulanski, 1996).

In SSSE the context is in general the same, as the actors are related to the same field – sustainability solutions, which could facilitate the transfer of knowledge. But as it gets more specific, some of the contexts could change, for example:

If some of the actors share certain common knowledge with other organizations within the cluster, it could on the other hand exclude the communication with other organizations, because they do not share that same knowledge. Also, if there is not a common objective for being part of the cluster identified by its actors, then the transfer of knowledge can be affected.

This in turn also relates to the degree of the relationships between the actors, which is another characteristic of the context of knowledge transfer barriers. Szulanski (1996) uses the term “arduous relationships” to indicate when a relationship lacks of communication.
In the case of SSSE, it can be said, that the less communication there is between the actors, the harder knowledge can be transferred. Some relationships between the actors of the cluster are distant or do not even exist, which leads to the result that most of the knowledge always is spread from the same sources to the same receivers. This situation relates again to the fact of not completely understanding the benefit of the cluster. Some of the actors of SSSE for instance, are not willing to share knowledge with others because there is a weak or even no relationship with these actors of the cluster.

5.4 Relationship Building Process SSSE

In general, relationships among actors within the cluster enable to achieve goals through cooperation. In order to create an appropriate environment for the transfer of knowledge in a cluster, the strength of the relationships influences the success of the transfer decisively. As a part of relationship marketing, relationship building consists through three main steps: establishing, developing and maintaining relationships. By following these three steps long-term relationships can be created. As a result of a successful building process an organization finally shares routines and practices.

Within the cluster of SSSE strong relationships are also perceived as overall important and more over are described as priority. The study of the cluster of SSSE also shows that there is a common interest within the actors to support the building process of relationships. The description of the relationships in SSSE varies from satisfactory to strong. In particular during to the task of working and managing projects together, the degree of relationships is stronger than in an at-rest-phase.

The workflow within the cluster is always related to the existence of current projects. If the cluster gains potential customers and requests of them, suitable companies that can fulfill those requirements are picked out. When there is an interest on behalf of these companies, a project team constitutes of companies, often the university and sometimes also the municipality will be formed.
To some extent, relationships within SSSE are beginning to be established with joint projects. Before, the actors are part of the cluster, but this is one of the only connections until there – that all are “just” actors within the cluster. But within these project teams a more active exchange of knowledge can be ensured. To relate again to the steps of the relationship building process, this phase can be named as the developing stage. This circumstance in turn changes rapidly when a project is done. Hence the last step of maintaining relationships can be described as almost bypassed.

However, the relationships within SSSE tend to be volatile due to the case of working in projects and therefore also from project to project. As a result a short-term thinking, expressed by thinking from project to project is typically encountered.

5.5 Analysis Summary

First Research Sub Question: Which barriers are faced during the transfer of knowledge?

Some of the actors within SSSE have a lack of flexibility and disposition to transfer knowledge with others. According to the theory, lack of motivation is part of the characteristics of the receivers that could be a barrier in the knowledge transfer process. If the actors, that are the receivers of the knowledge, have a lack of motivation to receive certain knowledge, then that could be an important barrier. In SSSE there is not a complete understanding from the actors of the benefits and advantages of being part of the cluster. This situation may not allow the actors to be more involved within cluster.

Reliability is another important barrier present within the cluster. Reliability is about the existence of trust among the source and receiver. As stated before, in order to build trust there should be certain degree of relationship between the actors. In SSSE some of the actors do not know each other, so no trust has been developed yet. The absence of reliability during the knowledge transfer process is a consequence of this situation.
The context of the transfer is also another barrier present within SSSE. From a general point of view the context is the same for every actor because they share the field of sustainability. But as it gets more specific there could be certain differences among the actors that could affect the knowledge transfer process. Some of the actors in SSSE may have certain specialization or singular knowledge in some field that they may be able to share with other actors, but at the same time this situation can be an obstacle to get to know some others within the cluster.

Second Research Sub Question: Which role do the actors within a cluster play during the transfer of knowledge?

In first instance, Universities play the role of the source of knowledge. They provide initiatives to certain projects and transmit this to SSSE. Municipalities also perform as a source of knowledge by giving ideas to SSSE.

SSSE plays the role of a gatekeeper serving as a filter of knowledge (or knowledge catalyst) and then transferring it to the receivers. SSSE, represented by ACB, is an intermediary in the transfer process between the knowledge that Universities and Municipalities would like to send to the receivers.

The companies that are part of the cluster play the role of the receiver of knowledge. Municipalities can also have this role and receive knowledge from SSSE with the support of the Universities. SSSE coordinates the knowledge and decides the best approach to use in order to transfer the relevant knowledge to the receivers.

Third Research Sub Question: How can the actors of a cluster build long-term relationships among them and what could motivate this process?

Relationship building consists of three stages: establishing, developing and maintaining. Relationships in SSSE are established first by becoming part of the cluster. The developing stage comes in with regular meetings and the transfer of knowledge within the actors in the cluster; but the most effective option that allows a better development of relationships is the existence of joint-projects. When the actors share a
Knowledge Transfer within Clusters
Growth through Innovation and International Marketing - Master Thesis

project, the relationship between them and the cluster itself increases considerably. The last stage of relationship building is maintaining and it is approached in a similar way: by transferring knowledge among the actors to promote initiatives and cooperation between them. However, there is an interesting issue in this stage. When joint projects are finished, the relationships that used to be considered as strong tend to decrease their intensity. So, the maintaining stage could be a key factor in order to keep a relationship strong within the cluster.

Even though the relationships are established when the actors become part of the cluster, most of the times it is difficult for them to meet in person, and this situation could become an obstacle for building a relationship among the actors. But if the actors can build trust among them a relationship can be developed in a less complex way.

However, an important motivator for building a relationship is having the same goal. In other words, if the actors understand the objective of being part of the cluster and the benefits that it could bring to all of them, then they could feel more motivated to participate and cooperate with SSSE. For this common understanding there is also the need that the actors transmit their expectations of the cluster, so that SSSE can work better in fulfilling those needs.

**Main Research Question: How can knowledge be transferred within a cluster?**

Some of the knowledge that is transferred within the cluster is explicit as it is regarding the industry or potential projects in the form of reports and articles. The more explicit the knowledge is, the easier it is to transfer.
Universities and in some occasions the Municipalities are the source of the knowledge due to the expertise they have in the sustainability field. They come up with initiatives regarding the industry and potential projects, which could be interesting for the other actors of the cluster, in order to make businesses. SSSE coordinates the entire process and filters the knowledge from the source to the receivers, who are the Companies and some Municipalities.

Taking the figure of Modes of Transfer, SSSE uses the first mode (from bottom to top) through the use of e-mail, newsletters, homepage information, phone calls and organizing meetings to provide the receivers with explicit knowledge in the form of articles or reports. In this case, the reception of knowledge is passive as there is not that much reaction expected.

There are as well visits to other actors of the cluster in order to learn from them about certain activities performed, which is in contrast more about tacit knowledge. These visits are part of the learning by doing mode of transfer, where there is a guided experience though observation. This mode of transfer is considered to promote active learning from the receiver.
6 Conclusions

Chapter six presents the conclusions for this thesis. The research sub questions will be answered first, followed by the answer and conclusion for the main research question.

The first sub question deals with the barriers that are faced during the transfer of knowledge within a cluster. From the analysis made, lack of motivation can be present within a cluster at the time of transferring knowledge between the source and the receiver. This issue could be a barrier if the source of the knowledge for some reason does not wish to transfer certain knowledge. It can also affect if the receiver of the knowledge does not want to receive it.

Another important barrier is the reliability of the source. Within clusters, trust is important in order to have a successful transfer of knowledge. If the actors do not trust in the source of knowledge, then the knowledge itself would not be perceived as reliable.

During the knowledge transfer process, the context could become a barrier. A context within a cluster could be considered fertile when it facilitates the transfer of knowledge. The actors of a cluster share a similar context because they are within the same field of business. Within the context topic it is also important to take in count the degree of the relationships, which is additionally a barrier during the knowledge transfer within clusters. When the relationship between the source and the receiver is strong then the transfer is less complicated.

The second sub question relates to the role that the actors within a cluster play during the transfer of knowledge. During the transfer of knowledge within a cluster there are three important roles: Source of the knowledge, gatekeeper and receiver of the knowledge.

Within clusters that have Universities as actors, the source of the knowledge can be identified. Universities play the role of the source of the knowledge supported by their
expertise in certain fields. The same situation happens with Municipalities as sometimes they can also be the source of knowledge and a backup for the gatekeeper.

Clusters are identified as the gatekeeper, as they coordinate the knowledge from the sources and transfer it to the receivers. Clusters work as a catalyst or funnel of the knowledge and seek for the best suitable option to transfer it.

The receivers within clusters are the rest of the actors conformed by Companies and Municipalities as well. These actors find the knowledge transferred to be useful because of the expertise that the sources of the knowledge have in the field.

The third research sub questions relates to how the actors of a cluster can build long-term relationships among them and what could motivate this process.

The relationship building process within a cluster can consist of three stages: establishing, developing and maintaining. The first stage happens when the actors first become part of the cluster and establish the relationship. The second stage, the development, can be ensured by constant meetings between the actors and by working in joint-projects. These projects allow the relationship to be more constant and increase its intensity as there are fewer actors from the cluster involved. In the third stage it is necessary to maintain the relationships among the actors of the cluster. For this, the meetings and gathering between actors can help reinforcing the relationships between them. Special attention has to be paid to the stage of maintaining a relationship when a joint-project is finished.

In order to complete the activities mentioned above, such as meetings and gatherings between the actors, it is necessary that they have they willingness to do it. Trust plays an important role in the relationship building process as it can increase the level of such relationships. Trust can be developed by the actors by getting to know each other and cooperating within the cluster.

Actors can be motivated to build relationships with others when they have a common objective and understand the benefits and advantages of being part of certain
cluster. In other words, when an actor knows the possible outcome from being part of a cluster, then this actor could have a better disposition to cooperate with the objective of the cluster.

After answering the research sub questions now the main research question is taken in count and it relates to *how knowledge can be transferred within a cluster*. Some of the explicit knowledge that is possible to transfer within the cluster can be in the form of reports and articles, due to the expertise that the sources of such knowledge have in the specialization field of a cluster. It is easier to transfer knowledge when it is explicit.

The process of knowledge transfer within a cluster starts with Universities and in some cases also Municipalities. They serve as the sources of knowledge due to their vast expertise in the field. Then the flow of the knowledge goes to the gatekeepers, a role that is played by the cluster itself. The cluster is a catalyst of the knowledge, coordinating and filtering it to the receivers. The receiver role is played by other companies that are part of the cluster and municipalities.

Some of the modes of transfer (Figure 1) used by clusters are “specific directives” and “learning by doing”. The first one relates to the transfer of specific knowledge that could be in the form of documents or presentations to the receivers though the use of e-mail, newsletters, website, phone calls or meetings. This knowledge is explicit and does not require an active reaction from the receivers. On the other hand, learning by doing is a mode of transfer used for certain tacit knowledge. Within clusters there is an opportunity for the actors to cooperate with others and learn from them. This learning can be done by visiting the actors, observing or even practicing certain knowledge with the supervision of an expert in the field.

In conclusion, clusters can transfer knowledge within its actors with the support of the Universities and Municipalities that have vast knowledge and expertise in the field. Then the cluster effectively filters and coordinates the transfer of such knowledge to the
other actors of the cluster, which are the Municipalities and Companies that seek for business opportunities.

In addition, an open dialog is needed in order to understand the benefits of being part of a cluster and enable the cooperation between the actors. Relationships are an important factor within the knowledge transfer process. The higher the degree of relationship between the actors, the less complex will be the knowledge transfer within a cluster.
7 Recommendations

Chapter seven explains the limitations of the study and recommendations for further research, followed by special managerial implication for the case company SSSE. The paragraph about managerial implications should help to provide the cluster of SSSE with valuable and operational recommendations regarding the transfer of knowledge.

7.1 Limitations of the study

During the realization of this study about knowledge transfer within clusters there were some obstacles and limitations faced. First, as previously stated in the chapter of methodology, the thesis is based on a single case study. That means that the thesis only provides the point of view of SSSE.

Following, one of the limitations of the thesis is that the study provides in addition to it only the view of a few actors within the cluster of SSSE. Nonetheless the objective was to obtain as many different opinions and perspectives as possible, according to the limit of time the study had. The collected data during the interviews included the perspective of Companies (Small and Medium Sized Companies and Multinational Companies), a perspective of a Municipality, a research perspective represented by a University and the perspective of the cluster itself.

Another limitation of the study deals with the limited period of time to urge this study. Therefore no long-term observation was possible and thus the study is able to give insights related to a short-time perspective.

7.2 Recommendations for further Research

Due to the limited time for the study and also in order to reduce the complexity of the study, relevant and interesting side effects of the transfer of knowledge within a cluster could not been analyzed further.
The study helped reinforcing the fact that clusters are a valuable source of knowledge. It could be interesting to know how clusters can transfer knowledge to other clusters and which barriers this knowledge exchange has to face.

Another related topic for further research could deal with the management within clusters, different ways to deal with many actors and ensure the development of the cluster.

The study highlights the importance of creating trust within a cluster. But the actual findings are not including how this trust can be exactly build and which measures have to be seized in order to construct a cluster stamped by trust. This could be an interesting topic for further research.

7.3 Managerial Implications

Analogue to the findings of the thesis, specific recommendations in form of managerial recommendations will be given in the following.

- **Definition and explanation of the concrete goal of SSSE**

  This recommendation mainly is addressing the major issue identified within the findings. Nowadays SSSE does not communicate its goal or objective to its actors actively. This should be its priority when it comes to promoting the cluster and seek for cooperation from the actors. The objective of SSSE needs to be understood by the actors as a win-win situation.

- **Explanation of the benefits and expectations: SSSE ↔ Actors**

  Like the objective of SSSE, the benefits and expectations also need to be defined and explained within the cluster. As also indicated within the findings of the thesis, the actors sometimes not even know why they are part of the cluster. To some extend this is also due to the changing roles and responsibilities within a company – sometimes the affiliation of SSSE exists already several years and new managers do not know about the reasons of past made decisions. However, the benefits should be pointed out clearly from
the side of SSSE. The actors need to know “what is in it” for them in order to participate more actively within SSSE.

A second part of this recommendation focuses on the expectations from both sides: SSSE and Actors. On the one hand, SSSE has to formulate and communicate its expectations from the actors – hence what are their tasks and role in the cluster. On the other hand, it is also important for SSSE to know about the expectations that the actors have from the cluster. This will help to identify the needs that the actors have and seek to fulfill them for the benefit of the cluster. But it is important that the actors are aware of the boundaries and limitations of a cluster. In other words, what is possible and what goes beyond the possibilities of a cluster.

- SSSE’s Branding

Different tools can be used to promote the brand of SSSE within its actual and potential actors, besides e-mails, newsletters and phone calls. An option can be to implement interesting and attractive multimedia tools within the website of SSSE. For example, there could be an online agenda developed so that the actors within the cluster can download it and use it to organize their business days. Another option could be to have RSS (Really Simple Syndication) news in the website that are refreshed minute per minute and that the actors feel the desire to go into the website in order to be informed. The important thing is to have traffic in the website and promote the actors to interact with it. Social Media (such as Twitter, LinkedIn, among others) can be another important tool in order to maintain contact with actual and potential actors in the cluster and promote SSSE. The cost is also an advantage of the use of multimedia and Internet.

Even though the existence of the Internet and Media, it is still a fact that some of the actors within the cluster are not that attached to this communication tool yet. For this reason it is still important to consider printed brochures that can be useful for meetings and other events where SSSE could be advertised.
- **After-project follow up**

  Special attention needs to be paid to the relationships after a project is finished. In SSSE the relationships between the actors are intense when there is a project running, but right after it is finished then the relationships’ intensity decreases. This is because there is a lack of a follow up of those relationships in order to maintain them. SSSE should implement a follow up program in order to gain the interest from the actors and keep the cooperation between them.

  One option for this recommendation could be organizing a meeting where every actor involved in the project could tell the expectations and opinion of what was done and improvements for future projects. These follow up meetings can be helpful to generate ideas, transfer knowledge and promote the relationship building between the actors.

- **Implementation of “Get together” events**

  Another issue detected within the findings is that some actors do not even know each other. It is a fact that there are a lot of actors within the cluster but nevertheless it is highly recommendable to establish a “get together” tradition so that the actors can meet more often.

  First of all, these types of meetings enable the exchange of knowledge between the actors within the cluster and also could create more opportunities for future projects. When the actors know each other better, they probably are more willing to be part of joint projects. It is a step by step process. Maybe a first “get together” reunion could not have a full attendance of the actors, but once it is recognized to be successful and perceived worthwhile, other actors will decide to also attend.

  Another option for “getting together” is the creation of events in form of symposium, conference or seminar. SSSE as a cluster is concentrating on the field of sustainability and it could be interesting to establish events related to actual and potential projects and business opportunities in the industry. The advantage for this is that SSSE can
have the support of the Universities, Municipalities and some of the Companies that are part of the cluster. This can also benefit the good image and reputation of SSSE.
References

*Literature and Articles:*


Websites:

SSSE http://www.sustainable-sweden.se/
LNU http://lnu.se/