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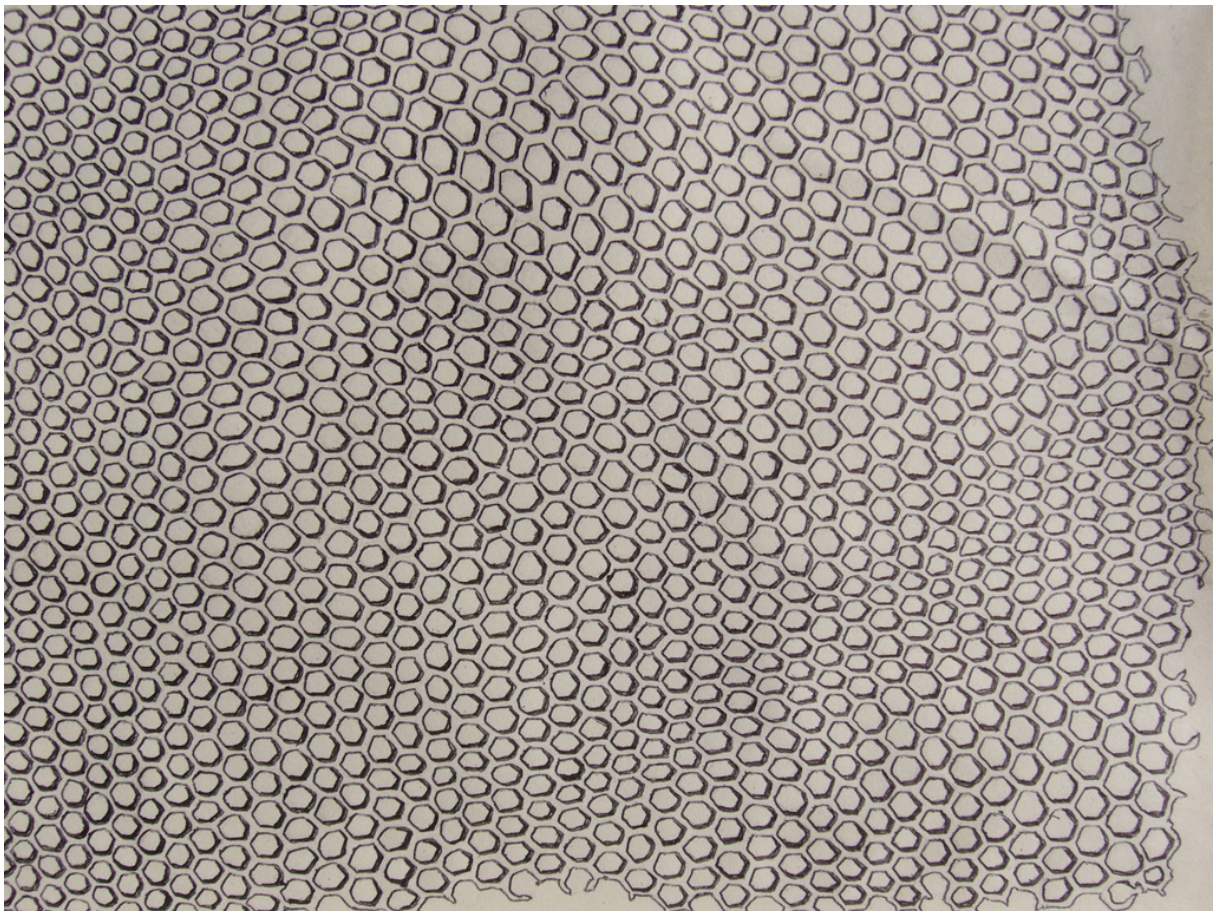
Department of Food Science

Challenges and Opportunities in Swedish Apiculture

Utmaningar och möjligheter för den svenska binäringen

Louise Valentin



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Abstract

Bees are of importance for the global food security. In Europe 84% and in the World 35% of all the agricultural crops are dependent of animal pollination (Winfree *et al.*, 2011:1). In agricultural production there is a huge lack of pollinators (Azien & Harden, 2009). A problem that is widely spread. In Sweden the problem becomes clear when looking at the statistics of the number of bee colonies during the last 20 years, where it has been a decline with 63 % (Statistiska Centralbyrån & Jordbruksverket, 2011). Pollination service is now considered as endangered (Klein *et al.*, 2007). The aim of this study is to describe the perceived challenging factors concerning the beekeepers and the possible development of apiculture in Sweden. By using the Triple Bottom Line (TBL), stakeholder theory and cluster theory the aim of the study is reached. The TBL represents a starting point that recognizes social, environmental and economic values. To understand for whom these values are created a stakeholder theory model that describes the different roles of stakeholders is added. Cluster theory is then used to enable mapping and analysis of the identified stakeholders. As a contextual understanding a literature review with research about the global current situation of apiculture is presented. The literature review gives together with qualitative interviews a picture of the perceived challenges and opportunities of the Swedish apiculture. The value creation of the services and products of the apiculture differs between the stakeholders, which leads to conflicts in the sector. The opportunities of the Swedish apiculture lies in using the competitive climate to raise the value of the products and services provided by the beekeepers. This can be done with competition and colaborations, raised demand conditions, develop new collaboration partners and promoting education. If all these parameters is fulfilled a strong apicultural cluster can be formed, which would be favorable for the whole sector. A developed apiculture would be profitable for the whole nation, since it raises the yield and contribute to a more sustainable society hopefully in line with the planetary boundaries.

Sammanfattning

35 % av alla jordbruksgrödor är beroende av pollinering från djur och i Europa är siffran hela 84 % (Winfree *et al*. 2011:1). Den vanligaste pollinatören är honungsbiet *Apis millifera* vilken tack vare sina pollineringstjänster är av största vikt för den globala livsmedelsförsörjningen. Dessvärre är det en enorm brist på pollinatörer inom jordbruksproduktionen (Azien & Harden, 2009). Sedan 20 år tillbaka har antalet bisamhällen minskat med 63 % i Sverige, en trend som även speglar världsläget (Statistiska Centralbyrån & Jordbruksverket, 2011). Pollineringstjänster anses därför som utrotningshotade (Klein et al., 2007). Syftet med denna studie är att beskriva de utmaningar som biodlarna upplever och den svenska biodlingens utvecklingsmöjligheter. Genom Triple Bottom Line (TBL), intressentanalys och klusterteori uppnås syftet med studien. Med TBL som utgångspunkt blir sociala, miljömässiga och ekonomiska värden grunden för studien. För att förstå för vem dessa värden skapas används en deskriptiv intressent modell som belyser de olika roller intressenter kan läggs till. De identifierade intressenterna kartläggs och analyseras sedan med hjälp av klusterteori. För att ge en förståelse kring det globala problemet med minskat antal pollinatörer görs en litteraturstudie. Litteraturstudien ger tillsammans med kvalitativa intervjuer en bild av de upplevda utmaningar och möjligheter son den svenska biodlingen står inför. Intressenterna i branschen har olika syn på värdet av de produkter och tjänster som tillhandahålls vilket leder till konflikter. Möjligheterna för den svenska biodlingen ligger i att använda det konkurrensutsatta klimatet till att höja värdet på biodlarnas varor och tjänster. Detta kan göras med konkurrens och samarbete, höjda krav från kunder, utveckling av nya samarbetspartners och genom främjande av utbildning. Om alla dessa parametrar är uppfyllda kan ett starkt biodlingskluster skapas, vilket skulle vara gynnsamt för hela branschen. En utvecklad biodling skulle vara lönsamt för hela nationen, eftersom den höjer avkastningen inom jordbruket och bidar till ett mer hållbart samhälle.

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1 Introduction

This chapter offers an introduction of why apiculture is an important part of agriculture and essential of food security. The presented problems leads to the aim and delimitations of the study. In the end of the chapter an outline of the thesis offers an overview.

1.1 Problem background

Agricultural production is an intricate part of several complex biological and social systems. These systems include both professional agricultural, horticultural and forestry production systems and social as well as cultural systems such as private homes, parks as well as natural biological ecosystems. Considering these circumstances it is understandable that a large number of parameters have to be fulfilled by both human and nature to reach a high yield of a crop. The parameters that nature itself provides are called ecosystem services, which enable human life by their processes. The definition of an ecosystem service is "*the benefits human population derive, directly or indirectly, from ecosystem functions*" (Bolund & Hunhammar, 1999). One essential and complex ecosystem that agriculture is depending on is beekeeping, also referred to as apiculture. The honeybees provide a vital ecosystem service when they act as pollinators.

Without bees there would not be access to the same food products as we have today. They are a matter of food security. To feed the world without pollinators, our diet would mainly be corn and rice or other crops that are wind pollinating or self-pollinating (www, Bee Urban 1, 2012). In Europe 84 % of all the crops are dependent on animal pollination (Klein *et al.*, 2007:303).

The honeybees do not only ensure that our menu is diverse they do also raise the yield of crops. Fruits and vegetables that have been pollinated by animals create a lager amount of biomass than those who are pollinated by humans (Klein *et el.*, 2007). Among all pollinating animals *Apis millifera* (the European honeybee) is considered as the most economical valuable pollinator of monocultures (Klein *et al.,* 2007:304; Aizen & Harder, 2009). In Sweden the honeybees are of great financial interest since they stand for 85% of the financial value of the production of apples, strawberries and oil crops (Rahbek Pedersen, 2009:8). In apple production the yield can be raised by 70% when supplying the field with enough of pollinators (Rahbek Pedersen, 2009:14). This is one of the reasons of why apiculture is seen as an essential part of the food supply chain.

Apiculture has frequently been debated in the media during the past years concerning the lack of pollinators. The government has started to take action of how to value ecosystem services and since a few years there is a vocational education to become a beekeeper (www, YH 1, 2012). The education is debated among beekeepers, some beekeepers find this as a threat, because they fear a decline of the prices of honey and their own income (Pers. mess. Levin & Johansson, 2012).

1.2 Problem

Thus the importance of bees for global food security and agricultural production there is a huge lack of pollinators in the world (Azien & Harden, 2009). The decline in pollinators is also visible in a Swedish context. During the last 20 years there has been a 46 % decline in the

number of beekeepers in Sweden, which has led to a decline in the number of bee colonies with 63% during the same period (Statistiska Centralbyrån & Jordbruksverket, 2011). This is an important national problem since the honeybee raises the yields but also pollinates wild flowers and creates a lager biodiversity. This pollination service is considered as endangered (Klein *et al.*, 2007).

Apiculture is an old way of getting a nice sweetener but as a profession it is young in Sweden (Duwe, 2012). The first professional beekeepers started 20 years ago, before this time it was only performed as a hobby. Still most beekeepers have it as a hobby and are not only relying on the income of the bee products to support the family (Kinley Silferberg, 2012). Depending on how much honey the beekeepers produce they are placed in different tax groups and different certification systems. The different circumstances have effect on the price of the honey. This has led to a conflict between professional and hobby beekeepers about the value of the honey (pers. com. Gerdin, 2012).

Furthermore, intense farming reduces the habitats for natural pollinators, which leads to biodiversity losses when the local fauna is affected (Aizen & Harder, 2009). For beekeepers this may be seen as a new opportunity when they can offer pollination services to the agriculture. This concept is common in northern America where beekeepers have colonies in trucks and sell the pollination service that the bees provide to especially almond farmers (www, Western Farm Press, 2012). But if agriculture only relies on honeybees as pollinators without the occurrence of wild pollinator the ecosystem becomes fragile.

Research suggests that there are a number of factors that may influence the development of the local honey production such as demographical factors of the key stakeholders in agriculture sector (Klein *et al.*, 2007; Readicker-Henderson, 2009). This research project focus on the perceived conditions of the beekeepers. Traditionally most beekeepers have had beekeeping as a hobby when retired but it is a decreasing trend among senior citizens (pers. com. Lannek, 2012). It seems difficult to tempt a new generation into a business with low market prices both for the pollinating services and for the products provided by the bees.

1.3 Aim and delimitations

The aim of this project was to describe the perceived challenging factors by the beekeepers and the possible development of apiculture in Sweden. It provides a brief contextual description of the role apiculture play in the agricultural systems. Research questions of particular interest were:

- Who are the key stakeholders of the apiculture sector in Sweden?
- Which are the perceived risks, barriers and problems for the development of Swedish apiculture?
- What are the perceived opportunities for apiculture in Sweden?

A product's way from a natural resource, to an actual product that reaches the consumer, entails many steps and actors in a supply chain. This makes it a very wide and complex issue where many different aspects can be studied. The thesis focuses on the key stakeholders of apiculture in Sweden. Limitations have been done to target the subject.

Apiculture is a hard business to define since there are many different ways of running it (Barlović, 2009). Many beekeepers do not have the bees as their only income; but acts as a

part-time job or a profitable hobby (*ibid*, 2009). The last five years Swedish Beekeepers Association (SBA) have had around 10 000 members, most of them are backyard/hobby or part-time beekeepers (www, Biodlarna 1, 2012). There is not any information about the number of professional beekeepers in Sweden but during the investigation for the project the interviewees in this study have estimated a number of fulltime beekeepers in Sweden from 20 up to 70 individuals. Considering the fact that almost all the beekeepers consider it as a hobby it is not possible to disregard the small scale part-time and backyard producers. The focus of the report is beekeepers in general and professional beekeepers in particular to get a wide view of the sector and at the same time focus on the ones that has a financial interest in the bees and not as a voluntary work.

The focus of this study is the beekeepers since they are the enabling factor of both the pollination service and the honey production. Customers are in this study considered as secondary stakeholders since they do not take part in the primary production. In apiculture consumers are both those using honey and those in need of pollination services *i.e.* retail, wholesale, farmers, restaurants and companies and private persons buying a CSR-service. The food industry is neither a part of the study since they mostly uses imported honey (pers. com. Levin, 2012).

From a biological perspective, a major problem is the decrease of pollinators. The main cause of this decrease is different types of diseases, pests and mites, which affects the bee colonies. One mite that is wide spread in Europe, America, Asia and North Africa is the *Varroa* that has been a struggle for Swedish beekeepers since 1987 (Rahbek Pedersen, 2009:35). The *Varroa* mite is the single most important reason for colony collapses in the world (*ibid*, 2009:31). This report will not go in detail the biological factors. Extensive investigations in reports are available on the importance of understanding the biological aspects of apiculture, including the role of viruses and mites. These factors are not disregarded in this study, but the primary concentration is to explain challenges and opportunities of Swedish apiculture. If research is done not only on the bees but also of the beekeepers and the sector it will lighten up other important factors that inhibit the growth of the apiculture sector.

Genetically modified organisms are a widely discussed subject with in apiculture (Rahbek Pedersen, 2009). Since it is difficult to control which flowers that the honeybees visit genetically modified crops fields causes problems for beekeepers that *e.g.* want to create an organic honey without pollen from genetically modifies crops. In Sweden it is only permitted to grow genetically modifies crops for research projects, which makes the areas few and this is why genetically modified organisms are not a part of the research subject.

A qualitative approach gives a diverse picture of the claims of different stakeholders within the same sector and subject (Kvale, 1997). A methodological technique such as a survey was excluded since the aim of the study was descriptive which makes interviews more interesting than statistic relevant results. The results of this study may not be generalized but it may illustrate some of the common problems within the business (Robson, 2002).

The empirical study is delimitated to the Swedish market since Sweden in 2008 took an initiative to create a food cluster as the new culinary country (Regeringskansliet 1, 2008). To be able to understand the Swedish market background information about the global market is of interest since it is not possible to separate the different markets.

The choice of the theoretical framework is guided by the aim. The thesis contains theories that enable identification of the key stakeholders in apiculture and their perceived opportunities and challenges. To be able to make a good investigation the theories needed to be delimitated as well. By choosing three theories the paper was delimitated to the combinations that they provided. The focus became three sustainability factors; social, economic and environmental. Aspects that also influences apiculture sector such as culture, technique and politics where not a part of this investigation. The research included the past, present and future of the sector to understand how the past affects the ongoing processes and the power structures. In chapter three the selection of country, sector, respondents and theoretical framework are explained further.

1.4 Outline

In **Figure 1** the outline of the thesis is illustrated. Chapter one presents the problem and the aim of the report. To clarify the continuous reading the conceptual framework of the thesis is described in chapter two together with a theoretical review. The third chapter offers a presentation of the choice of method. The fourth chapter contains background empirics beginning with a literature review where previous research presented, which puts the Swedish apiculture in a global context. The chapter continues with statistical data and a description of the analysed stakeholders within the study.

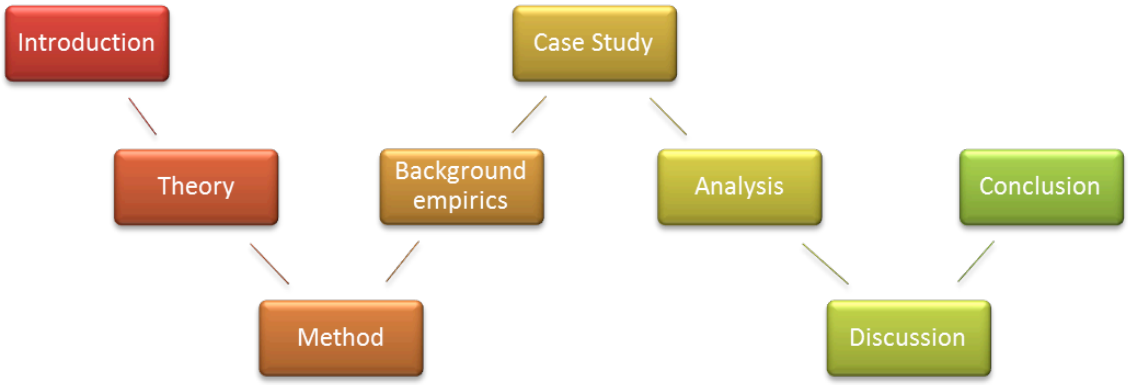

Figure 1. *Illustration of the outline of the study*

In the following chapter (five) the empirical cases are presented. Further, chapter six contains the analysis of the empirics, which is supported by the theoretical framework presented in chapter two. It is followed by a discussion in chapter seven. In chapter eight the conclusions of the study are presented.

2 Theory

This chapter offers a presentation of relevant theories that are required to fulfill the research aim, to describe and explain the challenges and potential development of the Swedish apiculture sector. The triple bottom line (TBL) represents a starting point that recognizes social, environmental and economic values. Given a TBL framework the next major theoretical perspective is related in a stakeholder theory model that offers an understanding for whom these values are created, by describing the different roles of stakeholders. As a way to organize the groups of stakeholders, next theoretical perspective, cluster theory, is used. Cluster theory enables mapping and analysis of the complex networks between different stakeholders. In the end of the chapter the conceptual framework is presented, it is a summary of the theories within the chapter. The conceptual framework has formed the structure of the interviews and further on worked as a tool in the analysis in the seventh chapter.

2.1 Triple Bottom Line

If talking about the future a business needs to be sustainable otherwise they will not survive in the long run (Elkington, 1999:57). A common way to define sustainability is as in the report "Our common future": "*meets the needs of the present without compromising the ability of future generations to meet their own needs*" (World Commission on environment and development, 1987:2.1). One tool to achieve sustainable business is the Triple Bottom Line (TBL), a model presented by Elkington where environmental, social and economic bottom lines are all taken into consideration to make a balanced picture of corporate objectives (Elkington, 1999:73). The three aspects do together form sustainability (**Figure 2**).

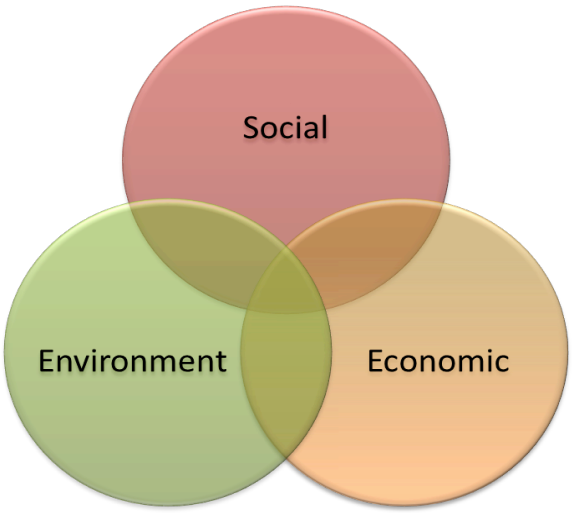

Figure 2. *The three bottom lines shown as circles that form a sustainable triangle in the middle (after Elkington, 1999:73).*

To be able to fulfill the three bottom lines some markets *e.g* agriculture need to be reconstructed (Elkington 1999:61). According to Elkington (1998) partnerships are needed to reach sustainability, both partnerships between public and private sectors as well as company internal partnerships. But not only partnerships are essential, the market is supposed to be open and competitive because that creates new opportunities and improved living conditions (Elkington 1999:61).

There is a criticism against triple bottom line since it is hard to measure social and environmental performance compared with financial results (Norman & MacDonald, 2004). Norman & Macdonald (2004) states that to be able to continue to claim the value of social and ethical aspects from companies, a measurable currency is required.

Bees are essential working as pollinators for both wild flowers and in agriculture, but to make apiculture sustainable there is also a need to be economically profitable and produced under good human conditions. Given the frames of TBL and the factors of value it is possible to continue the analysis describing for whom the values are for.

2.2 Stakeholder theory

The first time the concept of *stakeholder* was mentioned was in 1963 by Stanford research institute, but it first became a well-known theory when Freeman in 1984 wrote *Strategic management: A stakeholder approach* (Mitchell *et al.,* 1997). When building a sustainable organization it is essential to understand the interest and requirements of other stakeholders. A stakeholder can be defined as *"any individual or group that is directly or indirectly affected processes, and/or systems, but does not directly benefit as an economic participant such as a customer or supplier"* (Rainey, 2006:711). This means that within a business different stakeholder has different impact on the organization (Mitchell *et al.,* 1997). These stakeholders can be defined as key or primary stakeholders and secondary stakeholders, where the key stakeholders have the highest impact. There are three different ways of approaching stakeholder theory: descriptive, instrumental or normative (Donaldson & Preston, 1995:66f).

- Descriptive. "*It presents a model describing what the corporation is"* by explaining the past, present and future of the stakeholder (Donaldson & Preston, 1995:66).
- Instrumental. Screens the connections "*between the practice of stakeholder management and the achievement of various corporate performance goals"* (Donaldson & Preston, 1995:67). One drawback with the instrumental approach is that it is difficult to explore these specific links between cause and effect.
- Normative. The interpretation of the relationships between the stakeholders is based on different moral or political principles. This means that the "*Stakeholders are identified by **their** interests in the corporation, whether the corporation has any corresponding functional interest in **them**"* and that their interest of are of intrinsic value (Donaldson & Preston, 1995:67).

Henriques & Sadorsky (1999:89) presents a descriptive stakeholder theory with four different groups of high impact stakeholders; regulatory stakeholders, organizational stakeholders, community stakeholders and the media (**Table 1**). Regulatory stakeholders are governments and other organizations that put up regulations or have the power to influence the regulations. These are the ones that put up the conditions that all actors in the sector must follow. Customers, suppliers, employees and shareholders belong to the second group, organizational stakeholders. Those have the ability to influence the company directly by acting in a supportive way or putting a pressure on the company if they want to see a change. Community stakeholders works in another way; they do not act directly to influence an organization. The stakeholder acts then like a lobby organization and mobilize the public opinion. The fourth group, media, "*can influence society's perception of a company"* (Henriques & Sadorsky, 1999:90). Companies that are not prepared to face environmental

matters are those that are the most fretful with media attention. The perceived consequences of the media are low for proactive organizations.

Table 1. Illustration of different groups of key stakeholders after Henriques & Sadorsky (1999:89ff).

Regulatory stakeholders	Organizational stakeholders	Community stakeholders	The media
• Governments • Trade associations • Informal networks • Leading firms in environmental matters	• Customers • Suppliers • Employees • Shareholders	• Community groups • Environmental organizations • Other potential lobbies	• Mass media

"It is also almost a truism that firms cannot be successful in the long run if they consistently disregard the interests of key stakeholders" (Norman & MacDonald, 2004:243). A company needs to detect their stakeholders since they are affected of them but also since the company affects its stakeholders, it is an either-way communication (Mitchell *et al.,* 1997). It widens up the management by putting the firm in its context and provides a way to understand a company in a broader view than just profit maximization (Mitchell *et al.,* 1997). The context of the company gives a key to analyze the relationships that is needed as input and output for the business.

In Henriques & Sadorsky (1999) model of stakeholder roles some parts are lacking. In this thesis non-human stakeholders, such as honeybees, wild pollinators and crops that is influenced by pollinators, is regarded as secondary stakeholders. To follow the TBL and the definition of sustainability, unborn humans (future generations) are considered as secondary stakeholders.

2.3 Cluster theory

Cluster theory derives from the well-cited text "*The competitive advantages of nations*" written by Michael Porter (1990). The relationships and social networks between stakeholders within a cluster influence the company and what the company will achieve (Kilduff & Tsai, 2003). It seems like if a cluster works well it can catalyze innovation, drive productivity and incentives start-ups (Sölvell *et al.*, 2003). Cluster theory helps us describe the interaction between *strategy, structure and rivalry; demand conditions; related industries* and *factors condition* that forms strong organizations on a competitive market (Porter, 1990:71) (**Figure 3**). The four factors, often referred of as the diamond of Porter, create together a creative context where firms can develop and particular industry becomes successful (Porter, 1990:71). It does not say that all companies will succeed, but the sector as a whole will be developed.

Figure 3. *The interactions between the four factors that creates a strong cluster also called the diamond (Porter 1990:72)*

Strategy, structure and rivalry, is the national context of the sector, the frames of how a company is created and organized (Porter, 1990:107). In a cluster, both competitive and collaborative businesses acts side by side, which is an essential part of the dynamics of a cluster (Karaev *et al.*, 2007). These types of clusters may create a climate that leads to sustainable national advantage (Porter, 1990:118). For a nation competition between businesses is an advantage since it the different companies create a pressure on each other to develop. Porter states two types of competitive advantage, lower costs and differentiation (Porter, 1990: 37). Lower cost means to produce a product or service to have lower costs than the competitors. With differentiation the company may instead compete with a unique value such as quality or after-sale service. When one company succeeds within a business it does frequently attract new rivals to the sector (Porter, 1990:118).

Demand conditions are essential, high demanding customers that criticize the products or services force the sector forward (Porter, 1990:86). To know the demand of the customer is profitable for the business since it force them to develop and innovate to keep up with the demand. If the company is alert about the demand they can have an earlier and clearer picture about the need of the customer. This gives the company an advantage on the market but do also make the whole sector stronger by increasing the competition. The quality of the demand is also important for a company to improve. High demanding local buyers leads to "*newer and more advanced segments over time*" (Porter, 1990:89).

Related industries can be a good collaboration partners since the interactions may develop innovation important for the productivity within the cluster (Porter, 1990:100). Related industries are suppliers and other partners that may facilitate cooperation and innovation. Close working collaboration with related and supportive industries gives a competitive advantage since there will be a flow of information between the partners and there is an opportunity to influence the companion.

Factor conditions means access to human, physical, knowledge and capital resources as well as infrastructure, well-educated employees, closeness to new research, but also venture capital (Porter, 1990:73). To make strong clusters it is sometimes profitable for the government to encourage these arrangements, but never to control them (Etzkowitz & Leydesdorff, 2000). Tax incentives and providing research are measures that can be established by the government to encourage a cluster. Governmental interference is necessary if new collaborative forms are demanded as an organization do often prefer to stick to already established contacts rather and creating new ones (Håkansson *et al.*, 1982).

There are several ways of identifying a cluster. Geographical clusters is delimitated to related industries and companies located in the same area/city/region (Gibbs & Bernat, 1997). The companies may have a certain location depending on what types of need the business have. A supplier- consumer relation that requires short distances of and face-to-face communication or it could be a natural resource in the proximity or another input that is required for the company such as a university. A cluster can also be defined as a sectorial one, where the sector is the defining part that delimitates which stakeholders that are included in the cluster (Giuliani, 2007). The cluster can also be a combination between both of these with a delimitating geography as well as being defined on a sectorial level.

To form a cluster it is facilitating if there are a cluster institution for collaboration between the four factors (Sölvell *et al.*, 2003). To create a cluster an initiative is required; it is a way to coordinate *"efforts to increase the growth and competitiveness of clusters within a region, involving cluster firms, government and/or the research community"* (Sölvell et al., 2003). The uniting part of a cluster initiative is essential since clusters are not hierarchic but built up by complex relations. It is difficult to form cluster initiatives since they should not direct the cluster but coordinate.

2.4 A conceptual framework

It has been proven that the triple bottom line contribute to a better financial performance (Norman & MacDonald, 2004:166). This is why "*Food and agribusiness firms may choose to adopt socially responsible practices to improve their images among consumers and stakeholders"* (Detre & Gundersson, 2011:166). The agriculture production claims a long-term sustainable production of a crop to be able to face growing global population (*ibid*, 2011:169). Agriculture is also a market that needs to be restructured to promote sustainability with price and other signals (Elkington, 1999:61). This is why TBL is one of the essential theories in the thesis.

Given the TBL framework it is of interest to understand for whom these values are created by using stakeholder theory. The descriptive stakeholder theory is chosen to give all stakeholders the same legitimacy to tell their point of view. Since TBL is the frame for the theories it is necessarily to make sure that the theoretical frames as a whole has a TBL perspective. This is why the stakeholder grouping of Henrique & Sadorsky (1999) with regulatory, organizational and community stakeholders as well as the media also is needed in the conceptual framework (**Table 2**).

Table 2. Illustration of different groups of key stakeholders that is considered within the study (after Henriques & Sadorsky, 1999:89ff).

Regulatory stakeholders	Organizational stakeholders	Community stakeholders	The media
• Swedish board of agriculture • EU • Certifications	• Suppliers • Consumers • Retail • Food industry • Chefs	• Community groups • Potential lobbies • Beekeeper organizations • Education	• Mass media • Social media • Science press

As Elkington (1999:61) describes it "*Sustainability requires new visions to energize society, together with new forms of co-operation between government, business and society"*, which makes it understandable why the analysis focus on the regulatory, organizational and community stakeholders. This ia why the media will not be represented by a respondent in the case study. This does not mean that media is excluded from the thesis. Media is included in the literature review and in the interviews the importance of media is a theme. With the expression media, newspapers, magazines, popular science, radio, television and social media, are considered.

To be able to organize the different stakeholder groups cluster theory is added as one of the theories where the diamond of Porter is an essential part. Since apiculture is a small business in Sweden the third factor of Porter's diamond *Related industries* has widened up to also include other sectors that is not considered as industries, such as the cultural sector and service business. The business theories are in this study applied on a whole sector.

In this study cluster theory was also of interest since clusters is a way to reach a successful sector (Porter, 1990). Development and success of apiculture is fundamental since it is an important part of the food supply of the society. It is of the importance of the nation to make sure that the apiculture is a growing business, if the nation wants to have agriculture within the borders.

3 Method

This chapter accounts for choices made concerning research design. First the method for literature assortment is presented. In the following parts of the chapter choices concerning the theoretical framework, country and sector are described. The fourth part of the chapter accords for choices and explanations related to the empirical investigation. Lastly, the considerations of the ethical aspects of the study are presented.

3.1 Literature review

Commence of the project was to understand the complex relations between apiculture and environment, society as well as economy. To really find out the relations a literature review including an exhaustive review of preformed research was made.

The literature used in this study is mainly based on articles found at academic management and food science related journals. A systematic method has been performed to certify that all relevant articles were screened. This systematic method is described in detail as the three phases.

Phase 1: First a wide search of academic and nonacademic literature concerning apiculture was performed, which gave an overview of the sector and an understanding of which were the current subjects. The review gave grounds for a gross of sources and formulation of a preliminary research object. The search terms that were used (**Table 3**) were chosen by analyzing the aim and sharpened by looking at the articles found in the initial searching. To avoid missing out relevant literature synonyms were used.

Table 3. Search terms in the literature review

TX all text		TX all text		TX all text
Beekeeper	and	Development	and	Marketing
Bee keeper		Management		Promotion
Bee-keeper		Assessment		Business
Apiarist		Evaluation		
Apiculturist		Production		
Bee master				
Apiculture				

Phase 2: In the databases Web of knowledge, JSTOR, Primo and Elsevier around 50 peer-reviews were targeted, which visualize that it is not an extensively researched subject. Among theses a practical screening was performed to evaluate the pertinence of the articles. The time interval for the articles was set in between 1990-2012. The time interval was set due to the fact that after 1990 the number of professional bee keepers in Sweden has stated to increase, before this time there were mostly just backyard beekeepers.

Phase 3: To get a full picture of the subject, the reference list of the articles were screened and also added to the review. The articles are from, Europe, Northern America and Africa. The lack of research within the field is a great limitation.

3.2 Identification of theoretical frameworks

Selecting a theoretical framework is of major importance since it enables the analysis; by choosing the frames the outcome of the research is decided. The theory enables a connection between the empirical data and the existing models. In this thesis stakeholder theory, cluster theory and triple bottom line were selected as the basic theoretical framework, the key to understand and explain the challenges and opportunities of the Swedish apiculture sector. To be able to identify whom the values were created for a stakeholder theory was used. To get a descriptive approach rather than a normative and political one Henriques & Sadorsky's (1999) descriptive stakeholder theory was used. It was important to have a theory that identifies the key stakeholders to be able to distribute the resources in a profitable way, to understand which were of interest for the qualitative investigation. To be able to map the internal relations and interactions between the stakeholders and understand the power structures and economical flow the cluster theory of Porter (1990) was applied. Since cluster theory is focusing on the economic value of a cluster there was a need of a theory that widens up the perspectives. Elkington's (1999) theory about triple bottom line (TBL) was added to be able to analyze economic, social and environmental values at the same time.

3.3 Choice of country and sector

The Swedish government took in 2008 an initiative to create a food cluster in Sweden; the name of the project is *Sweden- the new culinary country*. It is a project that works in five different foods related fields to create economic growth and employment (Regeringskansliet 1, 2008). The project has a focus of five different topics: food in the public sector, primary production, processed food, tourism and restaurants. This can be seen as an initiative by governmental policy to form sectorial clusters. Apiculture is one sector that is important in two of these topics: the primary production and processed food. It is both needed for the pollination of crops and a valued food product. Since apiculture is a small but growing as a professional sector within the Swedish food cluster initiative it is a good sector to explore within the scope of this essay.

3.4 An empirical study

Case study is a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence (Robson, 2002:178)

3.4.1 Case study

Case method is a suitable method for this project, given the needs for a contextual understanding for apiculture. It gives the researcher the context of the phenomenon in focus by answering descriptive questions like "how" and "why" (Robson, 2002). Almost everything can be considered a "case" (*ibid*, 2002:180) and it regards multiple methods of data collection (*ibid*, 2002:178). Handling different types of material like interviews, documents and observations, leads to strong empirical results of the study (Kvale, 1997).

To give the research a higher quality, triangulation and validation has been performed (Flick, 2006). Triangulation refers to an active strategy to check data from different sources, to ensure trustworthiness of the study. In this case qualitative methods as interviews were done but to ensure a balance between perspectives and nuanced descriptions of the empirical phenomena a literature study of the field was done in addition to the empirical study.

3.4.2 Interview

The expert interviews were chosen as a method since they are essential to attain the problems and possibilities in the sector and to attain facts that are not possible to reach in another way. Qualitative interviews give a diverse picture about the different views of different stakeholders within the same subject (Kvale, 1997).

The interviews had a thematic framework that was elaborated in a close connection to the theoretical framework. The interviews with prepared themes were performed as open-end questions since they are flexible, which allow the interview to dig deeper, clear up misunderstandings and provide unexpected answers (Robson 2002:275f). It is necessarily to have these "thematic frames" to make sure that all parts of interest are discussed.

As a part of a trustworthy interview, data validation is essential (Kvale, 1997). A part of the validation process is to ask confirmative questions of facts during the interview. After the interview a summary was sent to the interviewee by mail, where they were given an opportunity to validate and correct misinterpreted answers or add additional information. This validation process was made since a well-verified interview has a high potential to give a reflective and rich material (Robson, 2002:273).

The interviews were performed in Swedish since all the respondents had Swedish as their first language. When doing the interviews in Swedish the respondents could focus on the essence of the answer instead of how to express themselves.

The initial interactions to all respondents were taken either by telephone or by email, depending on the contacts that were present. All interview except one (Bee Urban) were performed as telephone interviews since the project did not have the financial resources for travels. This was a disadvantage since when not performing the interviews live it was impossible for the researcher to be as sensitive as in live situations, since the expression on the respondents face cannot be read nor can the respondent read the face of the researcher (Kvale, 1997). One advantage of telephone interviews was that they were less time consuming, since the respondents were often very busy since some of the interviews were done during a time of the year that is very time consuming for beekeepers which made them prefer telephone interviews. The interviews were recorded and further on transcribed. The summary of the transcriptions was sent by email to the respondents for validation, with the exception of the interview that were performed live, where the validation where made in connection with the interview.

3.4.3 Choice of respondents

To be able to identify the key stakeholders of the sector an orientating interview with a person familiar with the sector were done, as well as statistical data collection and a historical orientation of the sector. This background investigation gave an idea of which the first respondents would be. During the interviews collaborative and competitive businesses were discussed which shed light up on other key stakeholders of the sector. This made the process iterative and reflexive which enables the insight and analysis (Srivastava, 2009). Due to this process the empirics became more diverse since different stakeholder has different claims. To ensure an as equal number of females and males as possible, the respondents were also chosen by their gender.

Table 4. *The respondents their stakeholder category and organization*

Interviewee	Stakeholder category	Organisation		Interview dates	Validated
Christer Ankarlid	Organizational	Swedish Honey Packer	Chief Executive Officer	29/5, 27/8	√
Jonas Eriksson	Community	Swedish Beekeeper Association	Association Secretary	30/8, 6/9	√
Pia Gerdin	Community	Vocational Education of Beekeeping	Responsible teacher	2/7, 27/8	√
Arne Johansson	Community	Rural Economy and Agricultural Society of Skaraborg	Biprojektet Västra Götaland	19/6, 27/8	√
Gunilla Kinley Silfverberg	Community	The Swedish Professional Beekeepers	Vice chair-man	16/7, 27/8	√
Jackis Lannek	Regulatory	Swedish Board of Agriculture		30/5, 27/8	√
Dan Levin	Organizational	*Landskapshonung*	Chief Executive Officer	26/6, 16/8	√
Karolina Lisslö	Organizational	Bee Urban	Chief Executive Officer	15/8	√

In **Table 4** the interviewees are presented with their names, stakeholder category, representing organization and dates for interview. The respondents were selected both depending on the stakeholder category and their willingness to collaborate.

3.5 Ethical aspects

The aim of this paper was to describe the perceived challenging factors and the possible development of apiculture in Sweden. One ethical problem within the question is the decision of the key stakeholders. Even though the key stakeholders are selected after established theories there may be stakeholders that see themself as key stakeholders but they are outside the delimitations. If their voices would have been heard the outcome of the essay could have been totally different. Also within the delimitations something can have been missed out which changes the perceived challenges and opportunities.

Another ethical aspect of the research is if it is ethical to keep bees at all. Is it okay that humans keeps bees for our own sake and is it really necessarily, what if we instead made sure there were enough natural habitats for pollinators to live. Is it from an ethical perspective a business to defend when 50% of the population in the country are obese, do we really need more glucose?

To ensure the ethical aspects of the project the three guidelines of Kvale (1997) were followed; informed approval, confidentiality and consequence. Before each interview the respondents were told why the study was performed and that it was voluntary to participate. After the interview the main conclusions were sent to the respondent for validation. This was made to make sure that the respondents agreed of the interpretation of the answers but it also gave them a chance to correct if there were any misunderstandings. Since all respondents were answering in their profession there were no need to anonymization (Kvale, 1997:109).

4 Background empirics

This chapter provides statistics of apiculture and a literature review. It gives a background that is useful to be able to understand the context of apiculture in Sweden by placing the Swedish apiculture in a global context. In the first part of the chapter the most common reasons for running apiculture is described together with the statistics about apiculture in Sweden. The literature review provides an overview of research describing aspects of the apiculture and beekeeping business. It is presented in the following three parts of the chapter and is divided in sections after the triple bottom line. In the first section the environmental aspects of apiculture is presented and the underlying problems with a world without bees. The second part presents the social aspects of beekeeping. It is followed by a presentation of apiculture from economical perspective and a review of reports about what makes beekeeping profitable. The chapter ends with the composition of honey, which is of importance to know which values that lies in the product.

4.1. Different aims of running apiculture

The articles show the diversity of apiculture in the world where different local climate, economical and legal conditions have influenced the way of keeping bees. In the literature review two main groups of articles about apiculture could be identified. Those that analyses the benefits and services that pollinators gives nature and agriculture and those that investigates from which elements it is possible to make a profit of pollinators i.e. the bee and the beekeeper. In the literature three different beekeepers are mentioned (**Figure 4**); backyard beekeepers which are doing it as a hobby; part-time beekeepers that keep bees not on fulltime basis but are dependent of the income that the bees generate and full-time beekeepers that have bees as their main income. Globally, the reason for keeping bees is to make a profit of honey production, not essentially of the pollination services (Aizen & Harder, 2009:917). One proof to this is that the number of beehives in the world has increased by 20 million during the past 50 years. This augmentation is closely related to the increase of the human population, which means that the honey production per capita has been constant during the same period (*ibid*, 2009:917).

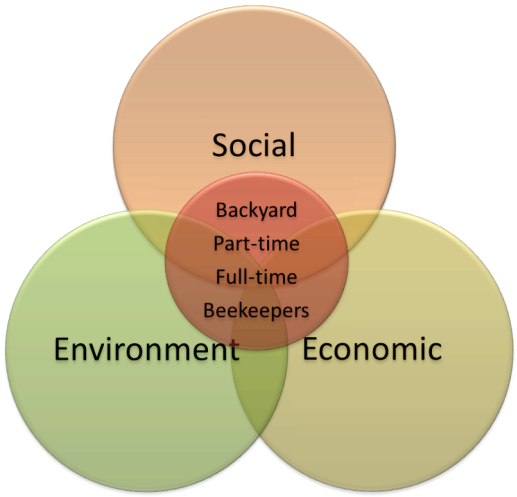

Figure 4. The triple bottom line shown in the back are the three main reasons of keeping bees for backyard and professional beekeepers. The sizes of the circles in the triple bottom line depend on each individual beekeeper.

It is not always the honey that is the most economical valuable product that the honeybees provide. In some regions pollination services is the essential, especially in areas with high intense farming. The pollination service can be sold to the farmer by a beekeeper that has portable hives.

Backyard beekeepers are not at the financial market in the same way as those that need to make their living out of the bees. Since they do not need to make a profit of their bees they may operate in regions where it is less profitable for professional beekeepers to do business. This is why they are of interest from an environmental point of view. The number of hives that manifests a backyard beekeeper differs with country. In Sweden a beekeeper with less than 10-15 hives is considered a backyard beekeeper (pers. com., Lannek, 2012) and in the US a backyard beekeeper may have up to 50 hives (vanEngelsdorp *et al.*, 2012:118).

In Sweden the number of beekeepers have decreased since 1990 (Sweden statistics, 2011). The official statistics of apiculture in Sweden are elaborated by the Swedish Beekeepers Association (SBA) (Statistics Sweden, 2011). This is the reason of why the official number of beekeepers in Sweden is equal with the members of SBA. This makes it hard to know the numbers of beekeepers in Sweden since all members are not beekeepers and all beekeepers are not members. The statistics in this essay mainly focus on the number of bee colonies and not the number of beekeepers.

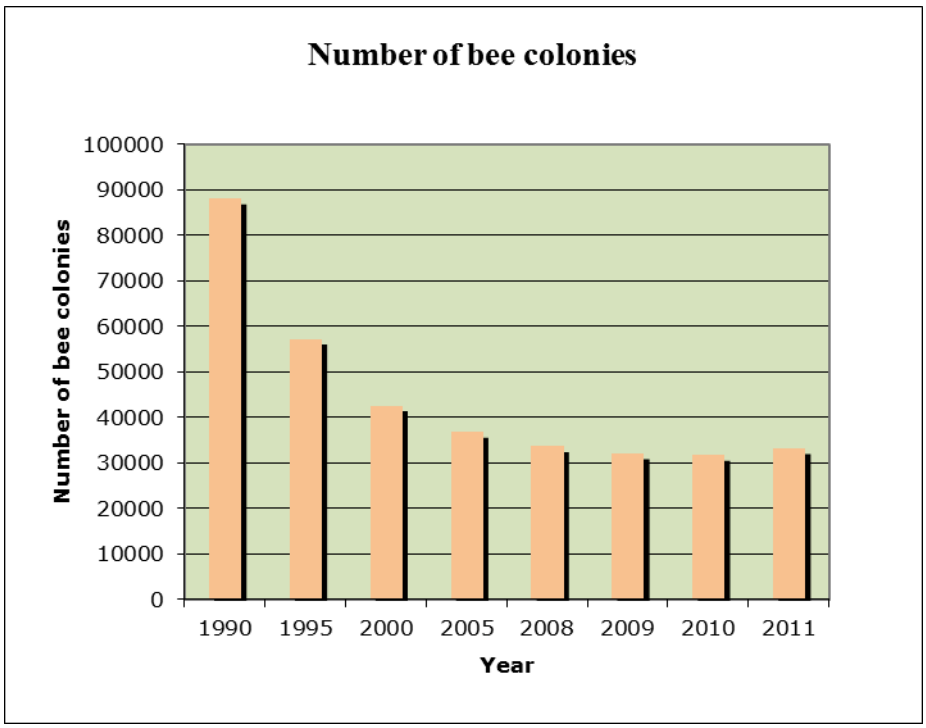

Figure 5. The diagram visualizes the decreasing number of bee colonies among the members of SBR between 1990 and 2010. Between 2010 and 2011 there were a slightly increase of bee colonies (Sweden statistics, 2011:122).

As seen in **Figure 5** the number of bee colonies has decreased from 88 040 colonies year 1990 to 31 667 year 2010, which is a decrease with 64 % in a 20 year time period (Statistic Sweden, 2011:122). Since 2010 the number of colonies has been stable with a slightly

increase. In 1990 the number of bee colonies per member were 4.9 and in 2011 it was 3.4 (**Table 5**).

Table 5. Number of members in SBA and number of bee colonies among the members from 1990 to 2011(Sweden statistics, 2011)

Year	1990	1995	2000	2005	2008	2009	2010	2011
Number of members	17923	13316	11726	10330	8777	9360	9673	9763
Number of bee colonies	88040	57284	42586	36791	33636	32052	31667	33191
Colonies/member	4.9	4.3	3.6	3.6	3.8	3.4	3.3	3.4

In apiculture, as in most agricultural issues Sweden operate under the rules of the European Union. Both the Swedish Beekeepers Association and the Swedish Professional Beekeepers are members of international beekeeper associations, to be able to influence the European Union in a way that is suitable for their organization (www, Biodlarna 1, 2012; www, Biodlingsföretagarna, 2012).

4.2 Environmental aspects

The greatest value of all that the honeybees provide is, without a doubt, the pollination service (Fries, 1997:116 translated).

Honeybees and wild pollinators are essential for biodiversity (www, Jordbruksverket 1, 2012). When forests and other ecosystems are turned in to agriculture land it leads to a global environmental change (Rockström *et al.*, 2010). For the pollinators this means that their natural habitats disappear. But the natural habitats do also vary with the intensification rate. In extensive farming there are natural habitats for unmanaged bees, but as more intense it gets there is a reduction in habitats for the natural pollinators (Aizen & Harder, 2009). The reduction of insects leads to a reduction of the pollination service that they provide and there are great biodiversity losses*, i.e.* less wild flowers and berries and also a problem for agriculture (*ibid*, 2009). The losses of species are an issue for the planet, since it is one of the planetary boundaries where we already have exceeded the limit (Rockström, 2009:472). The planetary boundaries "*define the safe operating space for humanity with respect to the Earth system*" (*ibid*, 2009:472).

One way to cure a part of this problem is to develop apiculture both in combination with agriculture as well as in "the wild", with habitats for the pollinators (Aizen & Harder, 2009). The US and the EU have since 2006 had great losses of pollinators, a problem that has been named, Colony Collapse Disorder (CCD) (Rahbek Pedersen *et al.*, 2009:33). The reason of the colony collapses is not totally identified, but mites, pesticides, breeding and a lack of flowers with pollen and nectar are the main identified reasons (*ibid et al.*, 2009).

While cultivating crops honey bees are important actors since they work as pollinators (Bolund & Hunhammar, 1999). One third of all the agriculture crops need to be pollinated (Winfree *et al.*, 2011). This is the reason for the important to have sufficient of pollinators close to the field. One way to provide pollination services to high intense agriculture by keeping honeybees in trucks and sell their ecosystem service to the farmers. This is common in North America especially when cultivating almonds, but it also noticeable raises the yield of clover seeds, field beans, oil beans as well as fruits and berries (Rahbek Pedersen *et al.*, 2009:8).

The apiculture is also a part of preventing deforestation *i.e.* in Cameroon, Tanzania and Nigeria beekeeping has been used as a tool for forest conservation (Ingram & Njikeu, 2011; Okoye & Agwu, 2008). In these areas the forest is essential for apiculture since the hives are located up in the trees. This makes also apiculture as an important part within agroforestry[1] (Okoye & Agwu, 2008). In Okoye & Agwu's (2008) study of beekeeping in Nigeria the main reason of apiculture is the income that the honey generates. In this area it is also common to do honey hunting since the artificial beehives are expensive. Honey hunting refers to finding wild bees in the forest and collecting their honey, the problem with this method is that when collecting the honey the whole tree where the honey is kept needs to be taken down which can be considered as a non-sustainable harvesting. One great benefit is that honeybees do also reduce biodiversity losses which motivates the society to preserve the honeybees to keep within the planetary boundaries (Rockström *et al.*, 2009).

4.3 Social aspects

Beside the environmental factors of beekeeping there is also a social aspect of apiculture. In poor areas, with low fertile soil beekeeping can be very useful. According to Yirga & Ftwi (2010) beekeeping is one of the major measures of poverty alleviation in Ethiopia where families are keeping beehives on non-fertile land. Apiculture does not require big investments nor is very physically demanding which makes it an activity that most people can perform. By doing interviews with 90% of the beekeepers in a village in the Tigray region Yirga & Ftwi (2010) concludes that the honey production is a way of developing the rural economy. The apiculture both contributes with working opportunities and honey and other related products. One third of the beekeepers in Nigeria also uses the bees as an entertainment for visitors and can be considered as a part of a rural development (Okoye & Agwu, 2008).

Another social value creation of honey from a consumer perspective is when the consumer know that they are supporting a good cause they may get a feeling of satisfaction (Engberg, 2012). The good cause could either be environmental or social.

The antimicrobial substance hydrogen peroxide has been found in honey, which may be used to treat bacterial infections (Wahdan, 1998). According to Cortes (2011) honey can be used to treat wound infections due to the inhibitory effect of hydrogen peroxide. Honey does also have prebiotic effects that support the gut flora (Sanz, 2005). Honey as a functional food can be considered as social aspect since it may raise the public health.

4.4 Economical aspects

Since the 1960th the amount of crops that need animal pollination have risen 4-fold (Aizen & Harder, 2009:917), which means that 35% of the global crop production is depending on animal pollination (Winfree *et al*., 2011:1). If there are not any natural pollinators in the area close to the fields, beehives can be used to solve the problem. This is a common solution in areas with high intense farming. When using bees for pollination service for agriculture crops, the honeybee (*Apis mellifera*) is the dominant one since it also produces honey (Aizen & Harder, 2009).

[1] Agroforestry is an agricultural system with "multi-culture". Where the different crops act synergetic to get a better yield. A system that has been developed by cultivating crops by imitating nature. It is most commonly used in tropical countries.

Winfree *et al.* (2011) have quantified the costs and benefits and estimated the economic value of pollination services in some areas in the US. This is done to improve the planning of the land to ensure the pollinators in the area. The financial interests in using the ecosystems services will develop the utilization of honeybees in the industrial agriculture. The value of the deposition of pollination services made by honey bees at watermelon fields in New Jersey and Pennsylvania have been estimated to 2.9±0.38 millions $/year (*ibid,* 2011:5). The values vary both depending of the climate, weather, temperature and amount of natural pollinators (Jensen, 2008). External pollinators as honeybees or bumblebees can increase the yield of apples with 70 % and yields of strawberry with at least 20 % (*ibid*, 2008:4) and watermelon with up to 100% (Yirga & Ftwi, 2010:201). Theses estimations show that it is profitable for some farmers to buy pollination as a service provided by beekeepers, but the study does not tell if it is profitable for the beekeepers. The values may also shift depending on the intensity of the farming (Aizen & Harder, 2009). In Sweden it is common that farmers offer beekeepers to place their hives close to their fields but they do not get paid (Rahbek Pedersen, 2009). Fruit plantation in Sweden is the only type of agriculture that pay the beekeeper for the pollination service even though pollinators increases the yield of clover seeds, field beans as well as oil seeds.

As said earlier the main economic reason for beekeepers for keeping honeybees is because of the honey production where the pollination service is a bonus (Aizen & Harder, 2009:917). It is the honey that makes apiculture in most cases profitable. There are still many hurdles for the beekeepers to make the production profitable *e.g.* low market prices and EU-regulations. One way of handling the low market prices is to make a value added product of the honey *e.g.* present the honey as a local or regional product. Overall there is an increasing demand for locally and regionally produced products at the Swedish market (Hallberg *et al.,* 2000). They are considered to benefit the environment and also to develop a more sustainable society. According to Hallberg *et al.* (2000) there is a willingness to pay among the consumers if there is an environment or traceability labelling. Since people consider local and regional products to be more sustainable these parameters will add value to the product even though the quality is not higher (Levrén, 2008). This is why it is not always profitable for small-scale beekeepers to expand since when they do they often sell it to the wholesale, which requires greater quantities and lower prices for the honey (Barlović, 2009).

4.5 The Honey

Honey has existed long before human and since 10 000 years it has been a source of carbohydrates to humans (Crane, 1985:102). The product is an aqueous solution and do mostly consist of invert sugar, which is glucose and fructose (Belitz, 2004). Together with the invert sugar the honey consists of other carbohydrates, enzymes, water, amino and organic acids, minerals, aroma substances, pigments, waxes and pollen grains. Honey should have a water content under 18 %. This low water activity gives the product a long self-life since the environment do not encourage microbiological growth.

Depending on the type of flower, the season and the geography the compositions of sugar in the nectar changes, which affects not only the taste but also the texture of the honey (Crane, 1985). Honey that has a high content of glucose becomes less liquid than one that primary consists of fructose (Belitz, 2004). In the honey there are also several di- and oligosaccharides presents that also affects the taste and texture of the honey. When honey is extracted from the combs it is supposed to be stored at 10 °C. During storage the color of the honey gets darker and the aroma decreases.

The honey does also consist of proteins. The proteins derives both from the nectar and from the bee (Belitz, 2004). By measuring the protein composition it is possible to identify from which region the honey comes. In honey 50-85 % of the amino acids is proline (Belitz, 2004:825).

The honey production starts when the bee disposes the nectar, pollen and honeydew in the bee's pouch (Belitz, 2004). The nectar becomes honey after being stored and ripened in the honeycomb in the hive. In the honey comb there are different stages to convert the nectar into honey, the stages are as followed: The nectar thickens when the water evaporates. The enzymes and acids that come from the bee increase, by hydrolysis, the content of invert sugar in the cell. Invert sugar has a very low water activity, which gives the honey a very long shelf life. Already in the honey sac of the bee there is a transformation from glucose to fructose, which also affect the viscosity of the honey.

To extract the honey from the honeycomb it needs to be centrifuged and the easiest way is to heat it to 40 °C. If the honey is exposed for high temperatures for a long time the properties of the honey will change. Other treatment of the honey affects the texture like filtration under pressure. There is an EU legalization about how honey should be treated (www, EU 1, 2012). One issue that is current is the heat treatment of honey. Heat treatment is done to avoid undesirable crystallization of the honey but also to eliminate the present yeast that may cause spoilage of the honey (Kretavicius *et al.*, 2010). With the heat treatment the antioxidant activity decline.

5 Case study

In this part the outcome of the interviews with the key stakeholders are presented. To be able to understand the structure and relations of the key stakeholders, the context of the organizations is presented in the first section. This is of importance when analysing the empirics. To organize the following part of the chapter the answers of the interviews of the regulatory, community and last the organizational stakeholders are shown in three different parts. The data is structured after the diamond of Porter; strategy, structure and rivalry; demand conditions; related industries as well as factor conditions and involve environmental, social and economic bottom lines of apiculture. This structure is chosen to simplify the analysis.

5.1 Key stakeholders of Swedish apiculture

The key stakeholders are sorted as regulatory, community and organizational stakeholders to create a structure in line with the theory. In **Figure 6** the different key stakeholders are shown.

Figure 6. The key stakeholders of apiculture sector in Sweden. The three stakeholders to the left are the organizational stakeholders. In the middle in green the community stakeholders are shown and to the right the regulatory stakeholder is located.

The Swedish Board of Agriculture is the only regulatory stakeholder within the study. Community stakeholders are the Swedish Beekeepers Association, the Swedish Professional Beekeepers, the Bee Project Västra Götaland and the Vocational Education of Beekeeping. The Swedish Honey Packer, Landskapshonung and Bee Urban are sorted as organizational stakeholders.

Swedish Board of Agriculture (SwBA)
Swedish Board of Agriculture is the administrate authority that advices the Swedish government in questions concerning agricultural issues (www, Jordbruksverket 2, 2012). They conduct National Fund that each year distributes five millions Swedish crowns to

different projects concerning production and marketing of honey. The Swedish government contributes with half of the total capital in the fund; the other part is financiered by the European Union. The rules of the fund is conducted by the European Union to contribute honey production and marketing but the Swedish Board of Agriculture has also added pollinations services and chosen to only encourage collective arrangements *i.e.* supporting the magazine Gadden and by providing information to promote pollination services to farmers.

Swedish Beekeepers Association (SBA)
The association has about 10 000 members, which makes it the biggest beekeeper association in Sweden (www, Biodlarna 1, 2012). Swedish Beekeepers Association (SBA) was founded in 1920 when the fusion of the two former associations (established in 1897 respectively in1911) where operated. Their mission is to "*do what is good for*" apiculture and the beekeepers in Sweden (www, Biodlarna 2, 2012). To fulfil the mission SBA is built up by committees, projects and local associations that arrange courses and events to educate the members and to gain new followers. SBA publishes Bitidningen nine times each year and is to be responsible for the publication of the statistics of apiculture in Sweden (Statistics Sweden, 2011). The major part of the members of SBA keeps their bees as a hobby.

Swedish Professional Beekeepers (SPB)
In the 1980th the first beekeepers in Sweden started to expand their hobby production of honey and to make their living out of honeybees (Duwe, 2012). The beekeepers that wanted to be commercial gathered a community called *Ekonomisk Biodling*. A few years later SBA started a commercial sector within their organization called *Yrkesbiodlarna*. In year 2000 there was a fusion of the two associations and in 2001 they established *The Swedish Professional Beekeepers*. Today they have about 500 members and their aim is to make beekeeping as profitable as possible in Sweden. To reach the goal they have different projects and one of them is called the Pollination Pool. Six times a year the Swedish Professional Beekeepers publish the member magazine Gadden. The respondent of the organisation in this study is Gunilla Kinley-Silferberg, who operate since two years as a beekeeper graduated from the Vocational Education of Beekeeping.

Bee Project Västra Götaland (BPVG)
In 2007 the project the *Bee Project Västra Götaland* were funded by the Rural Economy and Agricultural Society of Skaraborg. The project worked under five years to strengthen established beekeepers and inspire more people to begin as beekeepers (www, HS 1, 2012). The focus areas were product development, pollination, recruitment of new beekeepers and marketing of honey.

Vocational Education of Beekeeping (VE)
Since 2006 exists an education for professional beekeeper in Sweden at *Yrkeshögskolan för Biodling*, which is the only one in Sweden (www, YH 1, 2012). It is sorted under The Swedish National Agency for Higher Vocational Education that is "*responsible for an extensive quality assurance program that aims to preserve and maintain high educational standards"* (www, YH 2, 2010). A measure to maintain beekeeping in Sweden as a handicraft since it is of interest for the nation to have beekeepers (pers. com. Gerdin, 2012). No former experience of beekeeping is required to begin the program. During the two years of studies the students are supposed to be in charge of at least ten beehives. The program focuses on production and business and contains courses such as bee health, law and marketing. There are 12 vacancies each year (pers. com. Gerdin, 2012). The initiative to create a higher education of beekeeping was taken by The Swedish Professional Beekeepers.

Swedish Honey Packer (SHP)
Year 1969 Swedish Honey Packer was funded by SBA as a processing station for the members of SBA (Pers. com. Eriksson, 2012). In 2011 Swedish Honey Packer was sold out to Lindahl Invest AB but is still located in the same building. Together with SBA in Mantorp in Östergötland the Swedish Honey Packer process both Swedish and international honey and is the biggest honey-processing factory in Sweden and is the biggest wholesaler of honey on the national market. Around 75% of the production is imported honey. The honey produced is standardised (a mix of honey from different seasons and from different parts of the country) and creates the same taste of honey all year around. This lets the consumer know exactly how the product tastes.

Landskapshonung (LH)
In 1990, 10 professional beekeepers decided to gather their honey under the same brand as a co-operative (www, Landskapshonung 1, 2012). They sell their honey directly to the grocery stores to get a better profit (Pers. com Levin, 2012). Each beekeeper fills the bottles with its own honey. This makes the batches individual and the product varies with the season, district and processing. They are all under the same brand *Landskapshonung* but they do also label the honey with the name of the region to differentiate them from each other. *Landskapshonung* is the biggest wholesaler of Swedish honey in Sweden.

Bee Urban (BU)
A new established firm that offers CSR-service[2] to companies in urban areas (www, Bee Urban 2, 2012). The customers buy a concept of a hive and supervision for one year as a part of their CSR-work, including lectures about the importance of bees and the honey that the hive produces. Bee Urban started up in Stockholm and is now expanding to Malmö (pers. com. Lisslö, 2012). Except for the beekeeping they do also give lectures to companies, schools and politicians about bees, sustainable urban development and ecosystem services and works as public opinion leader in environmental issues. Bee Urban has another niche than most other beekeepers in Sweden (and in the world) since they are not depending on their honey production but the CSR-service. According to Bee Urban they are the first company in the world providing this type of CSR-service with bees. With this type of beekeeping they provide living for two persons with 35 hives, a beekeeper that only rely on honey production needs at least 300 hives to earn the living.

5.2 Regulatory stakeholder

The Swedish Board of Agriculture
The Swedish Board of Agriculture, the administratory authority in apicultural issues in Sweden, has an interest in having enough of pollinators in different areas of the country, since it is profitable for the nation. One of the greatest problems within the Swedish apiculture according to Lannek (2012) is that the recruitment of new beekeepers is going to slow.

Lannek (pers. com. 2012) states that the Swedish Board of Agriculture finds it important with both professional beekeepers and hobby beekeepers, since they often operate in different areas. Professional beekeepers do have their hives in areas with good opportunities for pollination, mostly in the southern parts of Sweden. The small-scale beekeepers are located in

[2] CSR- Corporate Social Responsibility

all parts of the country even in areas that are not that economical profitable for beekeeping and these are very important for the biodiversity.

As seen in **Table 6** Swedish Board of Agriculture encourages collective projects about honey production and pollination services, both to make apiculture as profitable as possible and as well encourage making agriculture as profitable as possible (Pers. com. Lannek, 2012). The National fund has pollination as one of the requests but the primary cause of the money is to encourage the production of honey.

Table 6. Summarized answers of the regulatory stakeholder, Swedish Board of Agriculture.

	Swedish Board of Agriculture
Strategy, structure and rivalry	Works towards an increased number of beekeepers by supporting cooperative project of production and marketing of honey with the national fund. *i.e.* product development and bee health
Demand conditions	The consumers, both of pollination services and honey are not high demanding. But to inform honey consumers is not at SJVs table.
Related industries	The national fund supports collective matters to encourage cooperation, but do not in particular encourage projects outside the frames of the Swedish board of agriculture
Factor conditions	Stimulates production and marketing of honey with the national fund.

The Swedish Board of Agriculture has seen that the demand of the customers of honey production and pollination services is not high. They support by the national fund projects that spread information especially about pollination service to farmers. Since consumers are not a part of agriculture, the Swedish Board of Agriculture do not provide information to the honey consumers. They mainly focus on the primary producers and that is why the consumers of pollination services (the farmers) are provided campaigns.

5.3 Community stakeholders

The outcomes of the interviews with the community stakeholders are presented in short in **Table 7** and developed below.

Swedish Beekeepers Association (SBA)
The biggest association of beekeepers in Sweden tightens different stakeholders together, *e.g.* researchers, beekeepers and farmers by providing projects, committees and local associations. Normally it is the local associations that make sure that there is new recruitment of beekeepers. During the last years there have been a slightly increase of members, which according to Eriksson (pers. com., 2012) can be seen as a positive trend. SBA do also encourage established beekeepers to develop and increases their number of hives by providing a coach of development. They do not find it as a problem that more honey is produced since the market is far away from saturated when 50 % of the honey consumed in Sweden is imported. The profitability is inferior in the association; it is up to each individual beekeeper to decide if they want to make a profit from their honey. SBA provides courses in how to treat the bees and honey but do not put an effort in courses about marketing of the honey.

The demand conditions are high from the retail and SBA has a committee that only works with quality assessment such as certification, food legislation and rules about packages and

labeling. These types of measures are sometimes required from the retail. SBA meets the needs of the retail and does not work directly towards the consumers of honey. Eriksson mentions that apiculture has become more current in the media during the last years, which has increased the interest of both honey and bees. To develop the need for honey among young chefs they have published the book "*Taste of honey"* were honey is a part of all recipes (Delvert, 2012). The book is supposed to be used as literature in the educational program for young chefs. In line with other parts of their organization where education is a very important part. The local associations do often have different study circles where beekeepers learn from each other. An example of one project is *Pollinatören* (The Pollinator) where SBA do make experiments together with a research group to investigate the influence that pollinators have on the yield, a project that later on can be used as a part of marketing of pollination services.

The Swedish Professional Beekeepers

"*We do absolutely need more pollinators, more honey and to fulfill this we need more beekeepers*" (pers. com. Kinley-Silfverberg, 2012). To reach the goal of increasing the numbers of beekeepers and at the same time make sure the price of honey increase one big problem has to be solved. According to Kinley-Silfverberg (pers. com., 2012) there is a friction between professional beekeepers and hobby beekeepers; those who need the money to make their living out of the bees and those who do not. This leads to that the beekeepers that give away their honey aggrivate for those who have beekeeping as their profession since it ruins the prices of the market (pers. com. Kinley-Silfverberg, 2012). The Swedish Professional Beekeepers require a gathered market, where all honey production should be able to be profitable.

"There has been a distinct increase of bees and apiculture in television, radio and newspaper lately and more is to come"(pers. com. Kinley-Silfverberg, 2012). To reach this goal The Swedish Professional Beekeepers work with a communication plan. Their communication plan includes both education of beekeepers as well as marketing of honey and pollination service to rise the profitability of Swedish honey and pollination services. The Swedish Professional Beekeepers want to cooperate with a university to get the facts needed for the communication plan, information that will be spread among all types of customers to raise the profitability of Swedish honey and pollination services.

Table 7. Summarized answers of the community stakeholders.

	SBA	SPB	BPVG	VE
Strategy, structure and rivalry	Works towards increased number of beekeepers, it is the local associations stands for the recruitment of new members, but the association do also have a coach of development	Works towards increased number of beekeepers, it is needed to fulfill the need of pollinators. The hobby producers dump the prices of the honey. The sector needs to be gathered.	Works towards increased number of beekeepers. Do not consider the honey market as saturated, consider the competition between backyard beekeepers and professional as a problem	Works towards increased number of beekeepers by education beekeepers. The conflict between hobby and professionals keeps the price of the Swedish honey on a constant low level.
Demand conditions	The customers that is high demanding is the retail which often requires quality controls.	Not high neither from farmers nor from consumers. Preparing a communication prospect.	Added value products increase the awareness of the consumers.	Would be higher if more information about honey could reach the consumers as well as pollination services to the farmers.
Related industries	Works a lot toward different related industries and research within the projects of SBR.	More cooperation with the food industry	More cooperation between beekeepers is required to be able to more cooperation when high volumes are needed.	The food industry greed for low prices. Farmers perfect collaboration partners.
Factor conditions	Provides education in the local associations and by coaching and different projects. The committees within SBR do i.e. the committee of quality works on the quality frames which make the honey possible to sell to the retail	Communication prospect with facts to reach different consumers and education of beekeepers	There is a lack of an educational ladder where hobby beekeepers can become professional.	Stand for the education of professional beekeepers in Sweden, financed by the government Takes long time to start a new beekeeping business. Logistics, material and economics can be considered as hurdles

The Bee Project Västra Götaland

Just like The Professional Swedish Beekeepers, Arne Johansson (pers. com., 2012) considers that one of the main weaknesses of Swedish apiculture is the conflict between the different prices among some hobby beekeepers and professional beekeepers. He also claims that some professional beekeepers do not want more beekeepers in the market since more honey would lower the prices, a statement that Johansson do not agree with. Johansson have confidence in that with increasing types of brands and added value products on the honey shelf in the store increases even the demand for traditional honey. More work to reach the consumers is needed, especially from the media, as news and televisions.

It is also important with cooperation between beekeepers to enable business. As an example Johansson (pers. com. 2012) gives *Västergötahonung,* a co-operative association of 35 beekeepers. The cooperation started when they got an offer to export dandelion honey to

Finland, but to be able to do it they needed a greater amount of honey than the amount of one single beekeeper. *The Bee project Västra Götaland*, has offered courses about how to increase the profitability by putting an extra value on the product and also other types of courses to educate beekeepers.

Vocational Education of Beekeeping
Just as the two earlier stakeholders claimed, there is a conflict between professional and hobby beekeepers in Sweden, a problem that needs to be solved to be able to say that the market is fair. At this moment there is a great pressure on the professional beekeeper since the imported honey is sold at very low prices and parts of the hobby production is sold outside the tax market (Gerdin, pers. com., 2012).

The demand conditions are generally low according to Gerdin and need to be risen to also increase the consumption (pers. com. 2012). Television and chefs are good alternatives of spreading information about the quality of honey. Since the chefs in television started to use liquid honey it has become popular among people. Gerdin believes that cooperation with television chefs would be a good way to promote Swedish honey. If the sector wants to raise the prices a co-operation partner as the food industry is not to prefer.

Gerdin did also discuss the problem that it is not possible to recruit beekeepers very fast since there are many parameters that have to be fulfilled like logistics and having enough bees. It is really difficult to grow fast as a beekeeper since it has to be made step by step, which slows down the recruitment.

5.4 Organizational stakeholders

A summary of the interview can be viewed in **Table 8** and in the following part the answers are presented in detail.

Swedish honey packer
As the biggest retailer of honey in Sweden the Swedish Honey Packer have recognized a decline in Swedish honey, in the way that they are not offered to buy the same amount of honey as before. The theory of Ankarlid (pers. com., 2012) presents that this is due to the current trend of local produced food, which opens up a market where it is easier for a beekeeper to start to sell the honey by themselves instead of through the industry. The Swedish Honey Packer do mostly sell imported honey, 75 % of the production is depending on the international honey. They see a problem in selling to much Swedish honey because they need to store some to make sure that they always can deliver all year around. To keep up with the demand either more beekeepers are needed or more hives. According to Ankarlid more Swedish honey is needed to be able to have a constant flow in the stores. The single most important demand from customers, is a shelf were it always should be possible to get Swedish honey otherwise they choose imported honey and find a new favorite honey, *"because the imported do not need to be of lower quality*". Ankarlid mentions often the health qualities of honey compared with white sugar, and the health benefits as a part of their marketing of the honey.

Ankarlid, finds different types of cooperation to access a new market; small-scale producers may co-operate to be able to sell larger quantities as well as for greater retailers to cooperate with the industry,

Table 8. Summarized answers of the organizational stakeholders.

	SHP	LH	BU
Strategy, structure and rivalry	Decline in the supply of Swedish honey during the last years to the industry. To compete with imported honey more Swedish honey is required	There is an overcrowding of beekeepers in Sweden, this makes the price of the honey decrease. The international competition is difficult since the standard of the Swedish honey is very high which requires higher prices.	More beekeepers are needed to pollinate. With new financial methods it is not a threat against profitability to be many beekeepers.
Demand conditions	The honey consumers requires a constant supply of Swedish honey, if the store self is empty they go for imported honey. Health qualities.	Not high.	With the right type of offer there are very high demanding customers. Honey with a message, reaches the high demanding customers. Educates employed at the companies which raises the demand condition.
Related industries	Cooperation between small-scale honey producers and with the food industry would be profitable	The industry just want the sheep honey called baker grave, not a good collaboration partner since they offers very low prices	Except the companies buying the CSR-service Municipal district administration, schools, The Cultural House in Stockholm, SBR and art exhibitions.
Factor conditions	Earlier almost all the honey in Sweden came to the production plant in Mantorp. Nowadays a lot of beekeepers find it easier to sell their direct to the customer		Educates beekeepers about urban apiculture. Always close to the latest research about apiculture

Landskapshonung

"There is a myth about a lack of Swedish honey" (pers. com. Levin, 2012). Levin states that even though 50 % of the consumed honey in Sweden is imported the consumers would not necessarily chose Swedish honey if there would be a greater supply. He is convinced that the trend of increasing numbers of professional beekeepers is a threat against the Swedish beekeepers since competition between producers may lower the prices. At the same time Levin mentions *Landskapshonung* as a successful example of co-operation. "*One single beekeeper fulfills the need of honey in Uppsala*", when looking at the honey production it is not necessarily with more beekeepers in Sweden according to Levin. The hobby beekeepers that sell their honey at low prices are not a threat against the professional beekeepers according to Levin (pers.com., 2012), it is a common behavior and that is the reason why it is almost impossible to stop it. The big threat according to Levin is the international honey that competes with the Swedish honey. The international beekeepers have other conditions than the Swedish producers, such as treatments with antibiotics and other, in Sweden, illegal substances as well as bad living conditions and low salaries.

Co-operation with the food industry is not of interest for the professional beekeepers since they only are interested in low budget products such as baker grave. This is also the reason why *Landskapshonung* started in the first place, to make honey more profitable for the beekeepers.

Bee Urban

The young CSR company is convinced that more pollinators are needed which requires more beekeepers. They do not consider the competition with other beekeepers as a threat since their business idea differs form a "traditional" professional beekeeping business. With this new financial method where, not only the income of the beekeeper is depending on honey production, but also on other forms of sales. Lisslö states that at the moment it is a current trend where beekeeping is considered as a cool hobby for aware urban citizens, which raises the demand conditions especially of *honey with a message*. A term that Bee Urban uses to explain why they may have a price that is five times higher than in the store and still be able to sell their honey. Honey with a message means that on each bottle of honey there is a description of the environmental contribution the customer do by buying their honey. In all the services that Bee Urban provides they do different types of education to teach about the importance of pollinators in our society and shorten the distance between the urban citizen and food production. But Lisslö claims that it is not only the consumer that needs to know. It is mainly the beekeepers that need to understand the value of their honey and put the price after that fact instead of what the consumer is willing to pay. During the last year there has been much more information in the media about bees according to Lisslö, a fact that she sees as a very positive trend. Bee Urban wants people to be aware of that it is not dangerous to live side by side with bees. They work towards making the urban citizen concerned about bees and see the value of having them close.

Bee Urban collaborate with SBA but also with other organizations that are not related to the green industry such as the cultural house in Stockholm, art exhibitions and municipal districts. They provide lectures to spread information about pollination and bees, and they do always try to stay close to the latest research about beekeeping and urban farming. They see this close contact between their organization and research as very important both to develop the apiculture as well as their lectures.

6 Analysis

This chapter analysis the empirical findings from chapter five with the theoretical framework presented in chapter two. The chapter is built up in the same order as the theory chapter to be easy to follow. It starts by analysing the value creation of apiculture by using Elkington's Triple Bottom Line. Then it identifies and analyses the stakeholders of apiculture, for whom the values are created. Lastly, the cluster formation of the stakeholders is analysed according to the diamond of Porter.

6.1 Triple Bottom Line

One way to investigate if a product contributes to sustainable development, is to find out where the value of the product is created. According to Eklington (1999) there is a need of a value creation in three bottom lines: social, environmental and economic. The three bottom lines can be seen in the apicultural sector but in this study it is clear that the different stakeholders have different priorities.

All the organizational stakeholders have a very strong economic bottom line since they are firms that are supposed to make a profit out of the business. *Landskapshonung* finds it as a big threat that more professional beekeepers are joining the market (pers. com. Levin, 2012). The fear lies in losing the economic bottom line if a decline in the honey price would occur. Within the organizational stakeholders there are also a difference in how they chose to do the value creation. As for Bee Urban where the triple bottom line is the essence of the construction of the company. Even though the bees of *Landskapshonung* and the bees of Bee Urban pollinate in the same way and have the same type of environmental impact the way they create value within the company are very different from each other. Bee Urban that offers a CSR service have an approach that makes it possible to sell their honey much more expensive than the honey of *Landskapshonung*. Bee Urban uses the environmental value of the honeybee and sell *honey with a message,* which raises the price of the product.

When *Landskapshonung* started the co-operative in 1990, their aim was to be able to get a better profit by selling without a middleman. By this added value to the product, in line with the social bottom line they can sell their honey and get a better price for it. *Landskapshonung* compete within the international honey market and as Levin mentions beekeepers do not work under the same conditions all over the world. By choosing Swedish honey in the stores the consumer knows that the beekeeper is working under fair conditions.

The regulatory stakeholder, the Swedish Board of Agriculture, has added pollination the aim of the National Fund and not only distributing money that encourages honey production. This shows that they have considered the environmental bottom line. The Swedish Board of agriculture sees it as an emergent issue to recruit more beekeepers to ensure pollination in Sweden since they have seen it both as an environmental issue and as a financial problem for the Nation since the value of the pollination service of bees for commercial crops is between 189-325 million Swedish crowns.

6.2 Stakeholders

There are many primary and secondary stakeholders of apiculture that are affected directly or indirectly of each other. The identified stakeholders are based upon the model of Henriques &

Sadorsky (1999) and were further developed to suit the stakeholders of apiculture in Sweden. Within the model a lack of stakeholders like future generations, bees and nature were identified. These stakeholders do also have a very weak focus when looking at previous research and with more of the respondents. The focus on bees is mostly considered when it comes to a direct benefit for the human economy or human well-being. As like the research of pollination service, mainly focus on the fact that bees may raise the yields to produce more food with a better profit.

The regulatory stakeholders are those that influence the regulatory base and frames, which all other stakeholders have to relate to. In the apicultural sector it is the Swedish Board of Agriculture that is the administrate authority in Sweden. They act as the advisory board to the government but the regulations that rule apiculture do start in the EU legislation.

Two of the community stakeholders of apiculture, the Swedish Beekeepers Association and The Swedish Professional Beekeepers could as well be a type of regulatory stakeholders since they also do submission for comments. They do both operate as lobby organizations both on a national level as well as on an European level and since they are lobby organizations and do not exactly set up the rules they fit within the community group. Within the community stakeholder group, the bee project Västra Götaland and Vocational Education of Beekeeping can be located since they are community groups providing education. The Bee Project Västra Götaland, SBR and the Swedish Professional Beekeepers do try to mobilize the public opinion by finding ways to influence the public to use honey and farmers to increase the need of pollination services.

The organizational stakeholders are suppliers that can influence the sector in the empirical study, Landskapshonung, The Swedish Honey Packer and Bee Urban were placed in this group. These are all suppliers that have the ability to influence the market in a direct manner. Landskapshonung is a great example of how a co-operative can reach the market and affect it. Bee Urban has created a totally new field within apiculture. The Swedish Honey Packer is also a key stakeholder as a supplier of honey to the market, especially since they are selling imported honey, which puts the Swedish apicultural sector on the global competitive market. Other stakeholders that are overlooked in the empirical study are the consumers, retail, restaurants, municipal district administration, schools and cultural institutions as well as future generations and the bees. The empirical study showed that most key stakeholders found the retail and the consumers as the important customers since the food industry offered too low prices and is not worth selling to.

The community stakeholders try to mobilize the public opinion to increase the demand of Swedish honey and pollination services. To manage this, they have all identified the media as a key stakeholder exactly in the same way as Henriques &Sadorsky (1999:90). The media could spread provided nformation to change the picture of Swedish honey among the consumers. According to Henriques & Sadorsky (1999) media is considered as one of the groups of high impact stakeholders. Many of the respondents spoke about the influence the media has on the market. Nobody mentioned media as something negative and half of the respondents spoke about the advantages that media could provide just by mentioning apiculture. Just as Henriques & Sadorsky (1999) states, the respondents are very aware of the influence that the media has on the society.

6.3 Clusters

This section analyzes the mapping and networks of apiculture by using cluster theory and Porter's (1990) diamond. A model based on four parts; *Strategy, structure and rivalry*; *demand conditions*; *related industries* and *factor conditions*.

6.3.1 Strategy, structure and rivalry

According to Porter (1990:107) a competitive market should be good for the nation and promote creation of new ideas and innovations. The competition between the companies do not necessarily need to promote lowering of prices, it may also force them to innovations of technology or services. One succeeding business often attracts new rivals to the market (Porter, 1990:118).

Levin mentions the price as the motivating factor of why there should not exist more professional beekeepers at the moment in Sweden. He is convinced that the demand of Swedish honey is not higher than the amount of honey produced at the moment. According to Levin a greater competition among professional beekeepers would force the price of honey to dive. The other two organizational stakeholders claim the opposite. During the last years they have seen an increased number of beekeepers but the Swedish Honey Packer has also noticed a decline in the volumes of honey that is offered to them. Due to the current trend of locally produced food they observe that the prices have been raised since the beekeepers sells less to the industry. As Porter mentions the rivalry do not always have to lower the prices, the competition is also depending on other aspects, as differentiation. *Honey with a message,* as Bee Urban presents their honey, is a way of differentiation that has succeeded. Their strategy gives them the possibility to compete and succeed with high prices. Landskapshonung is also using differentiation to raise the price of the honey. Their concept it is offer high quality, regional honey not by promoting the environmental benefits of pollination.

The competition between professional beekeepers is not the only rivalry on the market. One big issue, within Swedish apiculture, that most respondents mentioned is the conflict between professional and hobby beekeepers. The different working conditions and economic dependence is the source of the conflict. Some backyard beekeepers are not putting a value in the product that they are creating and may sometimes give away their honey or sell it at half of the market price just to dispose the honey. The problem that this behavior causes, according to most of the respondents, is that it keeps the market price low which makes it hard for the professional to earn their living. With this mentioned it is possible to see that all backyard beekeepers do not have the economical bottom line within their hobby.

6.3.2 Demand conditions

One important part to develop and innovate is to have customers that criticize the product or service provided. To have a clear picture of what the need of the customer is, having closeness to the market is essential.

The identified customers for honey production is the retail and the consumers. The respondents focus at the problem that the consumers do not know much about honey *ex.* the health effects and the importance of their pollination. They see this as the reason of why the consumers do not want to pay a higher price for the honey. Bee Urban is the stakeholder that really has managed to raise the price of the honey. They sell their *honey with a message* after lectures about the importance of bees for a sustainable environment. These lectures can be

seen as a way to raise the demand conditions but also a way to be close to the consumers, a good technique to get the full picture of which are the needs of the consumers.

The communication plan of the Swedish Professional Beekeepers will also be used to move the demand conditions from a focus of price to a focus of quality and origin of the honey. Within the communication plan the Swedish Professional Beekeepers the benefits of pollination services for the farmers will be included. The expectation of the communication plan is to reach the customers of honey and pollination service by the media to raise the demand conditions, which is low in both cases. These types of communication plan do follow Henriques & Sadorsky (1999) plan of communication an environmental commitment of a company. The Swedish Beekeepers Association has used the same type of strategy to raise the demand conditions. The book *The Taste of Honey* is a key that they use to raise the demand conditions among young chefs (Delvert, 2012). By involving a restaurant school in the project they both teach the ones that are present during the project and at the same time the book will reach perceived customers. The young chefs may then in their future career raise the demand conditions since they have gotten a base of the benefits of honey in food.

The Swedish Beekeepers Association goes also another way. In their organization it is possible to see that they have identified the retail as the customer instead of the consumer, and they have a quality committee that works towards the demand of the retail. This is an example of how the demand conditions forces the sector to react. The demand from the retail has made the beekeeper obligated to ensure the security and quality of the honey if they sell to the retail, a demand condition that has developed the whole sector.

6.3.3 Related industries

A vital connection for the sector is the related industries (Porter, 1990). In collaboration with related and supportive industries the productivity and innovation rate may raise, an essential part for a successful industry and cluster.

Related industries are often suppliers, which within this field are the secondary stakeholders such as bees and flowers, but also the framers providing fruit, berries and other crops that generate honey as well as crops depending on animal pollination. In Sweden the cooperation rate between apiculture and farmers is low both according to the respondents and the literature. The strategy like the communication plan of the Swedish Professional Beekeepers could work as a link to an intensification of the cooperation with the farmers. If a cooperation would succeed the farmers would not only be suppliers of nectar to the bees, they would also be customer by paying for the pollination service.

Bee Urban has identified other types of related “industries” like cultural institutions. Their first roof hive were located on the roof of the Cultural House in Stockholm a collaboration that opened up the rest of the market for the Bee Urban and other companies dared to let Bee Urban keep bees on their roofs. Bee Urban gained trust from the public and the Cultural House gained a spectacular event on the rooftop and an environmental advantage.

6.3.4 Factor conditions

Access to physical and human knowledge as high-educated employees and closeness to the research, are factor conditions that encourage strong clusters as well as capital resources (Porter, 1990). Factor conditions can be promoted with taxes or research by the government but it is important that the government should not control it. Governmental interference is

necessary if new collaborative forms are demanded as an organization do often prefer to stick to already established contacts rather and creating new ones (Håkansson *et al.*, 1982).

The National Fund is a way for the Swedish government to improve the factor conditions of the Swedish apiculture. They fund projects that in some way develop production of honey or marketing of honey and pollination services. This type of measures stimulates innovation since the projects raises the knowledge about apiculture within the sector. An important issue according to Bee Urban, is to not only raise the demand conditions but also to give the knowledge about the importance of pollinators (and therefore also the honey) among beekeepers. When the National Fund supports the magazine Gadden they support an organization that spreads information to beekeepers all over Sweden. Magazines are a good way of spreading information and in that way making sure that the latest research and other news are followed in the business.

The National Fund do only support collective projects, by doing that they force organizations to collaborate, which is an essential part just as competition to build a strong cluster. Another reason why the National Fund only supports collective measures is because they are not able to give to one single company because of the competition. If the factor conditions would not be equal, with an unbalanced competition, the cluster creation becomes weak.

When small-scale beekeepers want to increase the production they both have to buy or produce more colonies and this is one of the reasons why it takes time to develop the business and increase the number of pollinators. Another reason why most beekeepers grow quite slow is because of the difference in logistics when expanding the activity. Gerdin explains that they are recommending thier pupils to grow slowly to be able to know which way they should develop the logistic parts of the apiculture, such as the distribution of honey and the handling of jars.

Education is also a very important factor of the factor conditions. Since 2006 Vocational Education of Beekeeping has announced courses in beekeeping and the business surrounding it. But still it is at the local associations of SBA that offers courses where most beekeepers go. Their courses are mainly for hobby beekeepers or people that want to begin with beekeeping. Vocational Education for Beekeeping is the first to offer education to become a professional beekeeper and to study fulltime. Since the statistics only offers data of the members of SBA it is not possible to tell if the starting point of this education has led to more beekeepers or not. The beekeepers that come out of this education system have a clear picture of the research within the field.

7 Discussion

In this chapter the empirical findings in relation to the previous research and the research questions of the study are discussed. The perceived risk, barriers and problems for beekeepers. The second part discusses the opportunities and the future of apiculture in Sweden. The key stakeholders of apiculture in Sweden do have a clear picture of their needs but they do not all have the same needs. All stakeholders except the organizational stakeholder Landskapshonung is convinced that more beekeepers are needed, the reasons of why are diverse and described and discussed in detail in the following sections.

7.1 Risks, barriers and problems

Which are the perceived risks, barriers and problems for the development of Swedish apiculture? One of the perceived problems lies in the different priorities of the stakeholders. This makes the stakeholders have different ambitions. In the following three parts the different ambitions are discussed.

7.1.1 Environmental

The incitements of having apiculture are strong since the bees are needed for pollination and according to Fries (1997:116 translated) *"The greatest value of all that the honeybees provide is, without a doubt, the pollination service"*. The planetary boundaries that have been set up permit a biodiversity loss by ten species per year (Rockström, 2009). The actual value of disappearing species is over a hundred each year. If the honeybee populations decrease even further it will affect the biodiversity both of the agriculture, wild plants and other animals (www, Jordbruksverket 1, 2012). This is why pollination service is essential for the planet, environment and for agriculture, but according to the literature there is another focus that is of interest for the beekeeper, the honey (Aizen & Harder, 2009). It is the honey that is the product provided by the beekeeper that generates the greatest income. In Swedish agriculture the pollination service is often taken for granted and nothing the beekeepers get paid for. The environmental bottom line seems more like a positive side effect of apiculture that the main focus for professional beekeepers. The honey consumers pay for the honey product not the environmental service, a service that is a potential income for the beekeeper.

In other parts of the world where farming is more intensive than in Sweden the pollination services is of greater importance (Aizen & Harder, 2009). In intensive farming the natural habitats for pollinators are reduced, but also in thses areas crops need to be pollinated. The intense farming is in Sweden located in the south of the country and it is also where the pollination pool operates (www, Biodlarna 1, 2012). The environmental value of pollinators is low which can be identified since the number of natural habitats is disappearing and the pollination service is very rarely economically valued. Most farmers in Sweden do take the pollination service for granted and do not pay to have pollinators around the fields. In America a system with beekeepers driving around with the hives in trucks have been a solution for the lack of pollinators. One problem with these types of systems are that the colonies are not sustainable since it is difficult to handle the mobile bees with care.

7.1.2 Social

Even though the environmental values of apiculture is low there is a strong linkage between them. The social values are not often discussed when looking at the Swedish apiculture. With

a global perspective it is easier to find studies that express the importance of the bees for the village as a part of the income or the use of honey as a glucose source, these types of articles do mainly focus on developing countries (Yirga & Ftwi, 2012; Okoye & Agwu, 2008). Of course there are social values of beekeeping in Sweden as well, both in rural and urban areas. The Swedish honey sold support both the local nature and the pollinator dependent agriculture crops. This also encourages the rural development when activating the agriculture and apiculture, making the rural areas living and increasing the self-sufficiency. The urban apiculture do also have the same type of social bottom line since keeping the bees in the city makes agriculture more visible for the urban citizens and the gap between urban and rural areas may decrease.

The Swedish honey does compete with international ones, both high quality honey and low price honey. Since Sweden have strict rules about antibiotics and high living conditions the honey becomes expensive compared with a global market, which makes it hard to compete in the low price segment. When the consumer feels like she is supporting a good cause another social value of the honey consumption is visualized (Engberg, 2012). The type of differentiation by label of origin raises the willingness to pay, which means a rising of price, but the consumer can also be satisfied when knowing that the beekeeper gets a salary and that the product is beneficial for the environment. Which type of differentiation and origin that is the most valuable is up to each consumer to decide.

Another social aspect of the honey is the health benefits as an antibacterial product (Wahdan, 1998). Differentiation can be done by providing un heat-treated honey to customers that want the antimicrobial effects (Kretavicius *et al.*, 2010). On the contrary differentiation can also be made by marketing the honey as heat-treated which prolongers the shelf-life.

7.1.3 Economic

Three types of competition have been pointed out; between professional and hobby beekeepers, between professional beekeepers and between Swedish and international honey.

Gerdin, Johansson and Kinley-Silferberg (pers. com, 2012) do all see a problem in the competition between professional and hobby beekeepers. The core of the problem is according to them that the hobby beekeepers sometimes find it difficult to charge for their honey and some of them do not follow the law of taxes. This creates an unfair market where the professional beekeepers have to compete with these that do not have the same economical dependency of the honey. Levin do not find it as a problem that the hobby beekeepers sell their honey to low prices since, *"they always have done it"*(pers. com., Levin, 2012). Probably this is the reason of the conflict as well, beekeeping as a profession is new in Sweden and the market have not had time to find a way to work yet (Porter, 1990). But why do we need professional beekeepers at all? If the goal with the beekeeping is to make sure there are enough pollinators in the country there should not be a problem if the beekeepers did not want to make a profit out of the apiculture. But it should be of interest for the nation to make sure that there are pollinators in the whole country, which is easier if it is possible to earn the living out of the bees.

Levin (pers. com., 2012), who did not find the hobby beekeepers as a problem for the market, have a big issue with the vocational higher education for beekeeping since they graduate potential professional beekeepers. A fact that is a threat towards the existing beekeepers since, according to Levin, there is not a need of more Swedish honey. An increases number of beekeepers will make the competition harder. All the other stakeholders claims the opposite,

that Sweden is in need of more honey since over 50 % of the consumed honey is imported. It is not possible to tell the rate of the demand since there are no data available concerning this field. What is possible to tell is how the view of the stakeholders differs from each other. The organizational stakeholders are companies and the goal is to have good revenue. Levin is afraid that the competition will lower the prices but the literature shows the opposite (Porter, 1990). Competition forces the company to innovations and closeness to the demand, which will make the sector stronger. The problem with this is that what is good for the collective is not always good for the individual companies. If the company does not succeed to attract the customers they will not survive on the market, but competition will help companies to create a stronger business, which hopefully also will raise the price of the honey.

The third identified competition is between Swedish and international honey. More than 50 % of the honey sold in Sweden is imported. A great amount of this honey is located in the low price segment. This makes the Swedish honey compete at the same market as honey that is not under the same legislation as the Swedish one. To be able to compete the Swedish honey needs to differentiate to gain another market. As the demand of locally produced products increase there will be a market for the Swedish honey and also a way for Swedish beekeepers to differentiate (Hallberg, 2000). But of course may also international honey companies perform differentiation to raise the price, which also may attract the Swedish costumers.

7.2 Opportunities

Elkington (1998) encourage partnerships and puts it as an important factor to reach sustainability. The different stakeholders do have different ambitions and this makes it understandable of why partnerships between them are important; each stakeholder may contribute with its strength. If playing the cards right, the competitive market can be turned in to collaborations, which create *"win-win-win situations"* where all the three bottom lines are considered (Elkington, 1998:45). To reach this a cluster could be formed in Swedish apiculture. This could also be a part of the project Sweden - the Culinary Country since a cluster like this gives a sustainable national advantage. In the following section the parameters for cluster formation is discussed.

7.2.1 Strategy, structure and rivalry

Beekeepers in Sweden do in general have very small companies and a very low number of beekeepers produce large amounts of honey. Together in co-operations they can raise the amount of honey when distributing, which give the beekeepers strength on the market. This is what Landskapshonung did to avoid selling to a middleman. The same with Västergötahonung, their way to co-operate have opened a new market for them. By being able to provide greater amounts of honey they may export to Finland. Other beekeepers sell their honey to the Swedish Honey Packer, which then also may distribute larger quantities. These types of structures enable reaching the market (Porter, 1990). This case can be used in contrast to Barlović (2009) who mentions the problem for small-scale producers to expand. With these types of structures the small-scale producers reaches a new market without the need of expanding.

Another type of structure that has been successful is the CSR activities that Bee Urban is providing. As a good example of making a high profit out of a few hives by actually getting paid for keeping the bees, where the process is the value. Usually beekeepers in Sweden only earn their money out of the honey. Bee Urban has identified customers that are in need of their work, which is more than just the honey, a totally different strategy than the other

beekeepers have. Bee Urban sell their *honey with a message* as a way to differentiate their honey. When the customer buy the bottle they also buy the feeling of takeing action for the environment, which makes them willing to pay a much higher price than for the honey in the store (Engberg, 2012). Bee Urban do not really compete on the same market as other Swedish beekeepers since the company provides different services than just pollination and honey, like lectures, CSR-services and provoking debates. But still they have found a way to put a value on the product that is a lot higher than on the products in the stores. This could be a way for other beekeepers to follow.

The fear that Levin feels against the fact that new rivals are coming up since there is an education in beekeeping is understandable. In his district the number of beekeepers has increased which makes him fear that his costumers would choose another honey in front of his. According to Porter (1990) competition is in interest of the sector but require a lot of effort from the companies. This make the companies work harder since they work under competitive circumstances. It will form a stronger cluster and it will be profitable to be a part of it. It is better to turn the competition into an opportunity to develop the product or service that is being sold. Different types of differentiation would make the companies stronger. The differentiation could be honey in a beautiful can, origin labels or a narrative telling the customer that the honey that comes from a professional beekeeper is essential for the rural areas to live. *Landskapshonung* are doing differentiation by origin, but they are not telling the costumer why it is good to buy honey from the region. This is the key to the differentiation, when a regional product is sold, they need to convince the consumers of why it is worth paying more (Levrén, 2002). In this case it could be profitable to include the pollination service in the price of the honey or the fact that the composition of the honey becomes unique in each region (Belitz, 2004).

7.2.2 Demand conditions

The demand conditions both for pollination service and honey are low. When forming a cluster this is a problem since high demanding customers force the sector forward (Porter, 1990). The stakeholders in this study seem aware of this fact and have stated taking measures against the problem. They want to provide the important information to the customers and encouraging research about pollination and honey consumption.

The current trend of beekeeping among urban citizens has helped to raise the demand conditions. Behind this it is possible to see media as a strong stakeholder spreading the trend and the message of the lack of bees. The work of Bee Urban, with lectures about the positive environmental effects of bees in both rural and urban areas, increases the understanding of why the listeners should buy Swedish honey if they want to encourage Swedish agriculture and wild flowers. By telling a story that concerns the public, it could be the environmental issue, the way of the production or the people behind the product the honey may be differentiated for the anonymous honey products the company raises the understanding of the product among the consumers (Levrén, 2008). These types of measures do also shorten the distance between the primary production and consumer, a way to start gaining demanding customers, and creating a strong cluster. If Sweden in the future can offer areas without genetically modified pollen present it could open up for an international market, a value creation that would raises the price.

The market of pollination service is not developed in Sweden. Most farmers do not pay for the service provided by the beekeepers (Jordbruksverket 1, 2012). There is no tradition renting beehives in Sweden except for fruit production. A project as *Pollinatören* is good to

collect information that will be of interest for the farmers (Pers. com., Eriksson, 2012). The important part is then to spread the information to the farmers to make them demanding customers and also willing to pay for the service.

7.2.3 Related Industries

The link between Swedish apiculture and the food industry is weak. Most respondents find the food industry as a bad collaboration partner since they just require cheap honey. To create a strong cluster the factor *Related industries* really need to be strengthen (Porter, 1990). The collaboration can be performed as producing high quality products within the food industry where the honey in the food product can raise the value, which would make it an exclusive product. But it is also important to create other types of collaborations with other industries or other types of organizations. One possible collaboration partner could be the medical industry since honey is beneficial for the human health *e.g.* to treat bacterial infections (Wahdan, 1998). Bee Urban who co-operates with different types of organizations have made sure that they get paid both for the honey product, the pollination service, the CSR service and their work with hives. These types of collaborations could also be used in rural areas, where beekeepers could provide lectures and pollination services to private gardens.

When looking at America it is possible to find other possible developments of apiculture like a deeper relation between apiculture and agriculture where the beekeeper as well as the farmer gain on the collaboration. With the intensification of the agriculture the natural habitats for pollinators decreases, which opens up for beekeepers to co-operate with truck drivers to start providing pollination service in a larger scale (Aizen & Harder, 2009). This would also generate even more job opportunities since there is a need to develop the hives and trucks to have a better bee health within this type of apiculture.

7.2.4 Factor conditions

Right now Sweden has a concentration of the campaign Sweden as New Culinary Country, which makes apiculture fundamental in creating the cluster, condition that the apicultural sector should take benefit of (Regeringskansliet 1, 2012). According to Lannek (pers. com., 2012) the National Fund do not support customer education but she believes that it could be a campaign within the project Sweden the New Culinary Country.

To form a cluster out of the diamond of Porter (1990) a cluster institution is a facilitating factor, the National Fund works as this cluster institution. When being a cluster institution it is important just to coordinate the cluster and not to force it in a specific direction. It seems like the National Fund is in the beginning to create a cluster, by forcing collaborations and supporting the spreading of information within the business about the latest research about apiculture.

8 Conclusions

The aim of this paper has been to describe the perceived challenging factors and the opportunities of apiculture in Sweden. The perceived challenging factors can be summarized as different ways of value creation, which leads to conflicts between professional and hobby beekeepers, between professional beekeepers and between Swedish and international beekeepers. The conflicts arise since it is hard to make apiculture in Sweden profitable. The opportunities of the Swedish apiculture lies in using competitive climate to raise the quality of the honey, raise the customers demand of the honey and pollination services, create more partnerships with supportive industries and last but not least to enable more beekeepers by education but also facilitating logistics around the honey production.

Tendencies for a cluster formation have been visualized and the National Fund can be seen as a part of a cluster initiative. Beekeepers have started with collaborations but there is a gap between them and the customers. In a strong cluster the customers need to be demanding. The current trend of apiculture in cities has raised the knowledge among some customers and the demand conditions are slowly rising. There is a vocational education and closeness to the research within the field, which is an important parameter within a cluster. But to create a strong cluster of apiculture in Sweden more collaboration between the apiculture business and other stakeholders is needed, to find related industries. This would widen up which services and products the apiculture can provide. If all these parameters may be fulfilled a strong apicultural cluster can be formed, which would be favorable for the sector. A developed apiculture would be profitable for the whole nation, since it raises the yield and contribute to a more sustainable society hopefully in line with the planetary boundaries.

Future research within the field can investigate the demand and customer behaviour both among farmers and restaurants as well as the retail.

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Vikten av ett bi

När man sitter i solen och dricker saft så kommer det där surret och stör friden, det är biet som är i farten. Honungsbiet är tack vare sina pollineringstjänster av största vikt för den globala livsmedelsförsörjningen. I Europa är hela 84% av alla jordbruksgrödor beroende av extern pollinering för att ge skörd. Dessvärre är det en enorm brist på pollinatörer både inom jordbruks-produktionen och i det vilda. Sedan 20 år tillbaka har antalet bisamhällen minskat med 63% i Sverige, en trend som även speglar världsläget. Pollineringstjänster anses därför som utrotningshotade.

Låt oss titta på dem som tar hand om bina; biodlarna. I Sverige finns det drygt 10 000 biodlare, större delen av dessa gör det som en hobby och ett fåtal försörjer sig helt eller delvis på bin. Traditionellt sett har man i Sverige sålt honung men inte tagit till vara på de andra värden som bina ger vårt samhälle t.ex. pollineringstjänster. En tjänst som blir viktigare och viktigare allt eftersom att jordbruket blir mer intensivt och de naturliga boplatserna för bina försvinner. Biodlingsbranschen har olika syn på värdet av de produkter och tjänster som t kan få ett högre pris genom att presentera vikten av pollinering och honungens hälsofrämjande effekter i samband med försäljning. Genom att få jordbrukare att förstå hur viktiga bin är för deras verksamhet kan även pollineringstjänsterna få ett ökat värde. Möjligheterna för den svenska biodlingen ligger alltså i att använda sociala, miljömässiga och ekonomiska argument för att höja värdet på biodlarnas varor och tjänster. Detta kan göras med konkurrens och samarbete, höjda krav från kunder, utveckling av nya samarbetspartners och genom främjande av utbildning. Om alla dessa parametrar är uppfyllda kan ett starkt biodlingskluster skapas, vilket skulle vara gynnsamt för hela branschen. En utvecklad biodling skulle vara lönsamt för hela nationen, eftersom det höjer avkastningen inom jordbruket och bidar till ett mer hållbart samhälle.

Bin som pollinerar ett rapsfält kan öka skörden med upp till 20 %. Fröna får även en högre oljehalt.

Så nästa gång du hör ett bi surra bredvid dig tänk på hur den lilla insekten faktiskt påverkar din vardag!

Läs mer:

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Honung och hälsa

Honung innehåller ämnen som hämmar bakterietillväxt och är därför bra vid behandling av olika bakterieinfektioner, framförallt i sår. Dessutom fungerar den som prebiotica vilken påverkar den naturliga bakteriefloran i tarmarna, samt bidrar till en bättre matsmältning.