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Implementation of environmental management systems in small  
companies: A case study of Colabitoil Sweden AB

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Master thesis

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## **Abstract**

**Purpose:** The main objective of this thesis was to analyze the implementation of environmental management systems (EMS) in a small company.

**Design/Methodology/Approach:** The three models used in this study were developed to critically assess Colabitoil entire business environment both from the internal and external perspectives. In process, analysis of Colabitoil and its business environment in relation to EMS process of implementation used based on three frameworks. In particular, Deming cycle (1993) PDCA for implementation and continuous improvement.

**Findings:** The main driving force of Colabitoil environmental sustainability has been their credibility as a producer of sustainable products and their attribution to sustainable society which is of great importance to the public image of the company. With the Plan, Do, Check and Act, the organization can enhance a strong competitive advantage by integrating sustainable strategies into their organization goals and environmental objectives through continuous improvement in all aspect of the organization business environment. The organization employs its environmental objectives through strong advocate of translation from fossil to fossil free and practices environmental sustainability both on internal and external level in different areas of its business environment.

**Research limitation:** Like other case studies, the particular conditions found in the case company may not be found in other organisations. Therefore, authors are aware that the findings and the conclusions drawn in this thesis may have limited suitability to other companies. The provided suggestions are the hypotheses that are based on the results of the finding from internal sources. These hypotheses have to be checked with the customers' needs.

**Practical implication:** The authors recommend that EMS could be a suitable system to visualize the entire environmental business that Colabitoil needs to invest its resources to improve the level of environmental performance in their activities

**Originality/Value:** There is also a gap in research on SMEs within biofuels industry operating and contributing to environmental sustainability based on visions and goals of the company not by compliances. From this perspective the thesis fills in the gap and is one of its kinds.

**Keywords:** Biofuels industry, Colabitoil Sweden, EMS, SMEs and Change management.

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We would like to express deep appreciation to our academic supervisor María Barreiro, who has been helpful and provided us with professional advices, as well as personal guidance and encouragement during the entire process of writing this thesis. Without her, it would have been impossible to deliver and meet the deadlines due to the circumstance we encountered in the beginning of selecting a project.

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Thank you!

Gävle, June 2019

Clementina Godwin & Pablo Turrado

## List of Acronyms

CEO	Chief executive officer
EC	European Council
EMAS	Eco-Management and Audit Scheme
EMS	Environmental management system
EU	European Union
GHG	Green house gas
HEFA	Hydroprocessed esters and fatty acids
HVO	Hydrotreated Vegetable Oil
ISO	International Organization for Standardization
LCA	Life cycle assessments
MSOS	More sustainable oriented state
PDCA	Plan-Do-Check-Act
RED	Renewable Energy Directive
SME	Small and medium enterprise
SQ	Statue Quo

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# 1. Introduction

Over the last decades, understanding climate change and potential impacts on earth systems has increasingly become more important and concerns for both governmental and international organizations as well as our individuals (Houghton et al., 2001). Companies are responsible for major environmental and social impacts (Hart, 2000). A number of companies are taking consideration and have employed environmental sustainability strategies to be competitive (Eccles et. al, 2012).

Business operations should play a vital role in reducing and preventing environmental degradation (Levy and Newell, 2005; Henriques and Sadosky, 1999; Shrivastava, 1995). In the same way, an increased importance has been given to environmental management evaluation (Brio & Junquera, 2002). It is perceived that an assessment of environmental management gives the means of integrating environmental issues into an organization management function (EMS, 2002). According to Steger (2000), innovative companies are currently responding proactively towards environmental issues due to the rapid increase of environmental legislation and perceives sustainable trends as a business opportunity rather than burden.

Fishwick & Bamber (1996) stated that the external process and performance of environmental management system lies on the internal environment of an organization process because companies are obliged by legislation to implement a health and safety policy setup for routines, protocols, control measures and conduct risk assessments for their activities. With this regard, the links between quality, environment and safety are important function for organization practices. However, these element factors are difficult to distinction from one another (Scipioni et al., 2001).

Lozano (2012a) cited (Brorson and Larsson,1999; Robert, 2000) *stating Environmental Management Systems (EMS) are applicable "tools aimed at assessing the environment impact of an organizations"*. Environmental management system (EMS) is used as a tool to control an organizational activity and the impacts on environment in order to improve the business performance (Ammenberg et al., 2002).

## 1.1. Research Gap and Motivation

Environmental Management Systems enable the means for an organization to focus on reducing the environmental impact (Hillary, 2004). The awareness of these management systems is relatively connected to the internal process of an organization and adoption of system management models used in quality management to address environmental issues (Scipioniet al., 2001). Environmental practices could differ within and across organization due to size, resources and needs (Kirk, 1995).

Additionally, Scipioniet al., 2001 stated that *Eco-Management and Audit Scheme (EMAS) and ISO 14000 series* are also environmental management system standards developed to help organization and certify the EMS implementation for their activities. These management systems were designed for larger companies but also applicable to small and medium organization (SMEs) (Ammenberg & Hjelm, 2003; Hörisch et al., 2015).

Small and medium-sized enterprises (SMEs) contributes to a significant part of economic output worldwide (Eurostat, 2014; OECD, 2005). However, their activities also result to 70% of all environmental impact in business practices globally (Hillary, 2000). With this regard, Revell et al., (2010) argued that stakeholders such as customers, governments, and local communities are enforcing pressure and the SMEs are increasingly acknowledging the responsibility they have regarding improvement on their environmental performance.

Mitchell et.al (2011) argued that 64% of total industrial pollution are generated by the SME business activities. However, empirical research shows that small companies encounter numerous barriers when pursuing environmental sustainability implementation in attempt to adopt the guidelines (Aragon-Correa et al., 2008; Hillary, 2004; Murillo-Luna et al., 2011). Moreover, the problem of implementing EMS in one organization might differ from another of SME organization (Hillary 2004).

The main quest from previous study articulated and argued on how to address the barriers small companies encounters in attempt to implement Environmental Management System (EMS). In particular, the lack of the human and financial resources as well as how to tackle new pressures from stakeholders regarding environmental impacts (Brio &Junquera, 2002). Additionally, Hillary (2000) also stated that the industry sector is under-researched.



ISO 14001 was established to help organization to achieve environmental performance and objectives through assessment and control as well as adoption of environmental policy into their business strategy (ISO 14001:2015). However, despite the degree of success, some companies still have difficulties pulling off change and only few manage to forward the process of implementing management system (Hillary, 2004). For example, the lack of relevant information and knowledge sharing in an organization or a positive attitude toward adopting sustainability practices might be the most difficult barrier to enhance sustainability improvements (Hillary, 2004).

This work presents a case study of a small company, Colabitoil Sweden AB. In accordance to personal communication with the key account manager, the need to implement environmental strategies for continuous improvement is necessary. For this reason, it requires re-evaluation and determination to address current as well as future environmental trends to decrease future risk. In this case, it is vital that Colabitoil management acknowledges the need to analyze its business environment and integrated strategies for the future. The organization also need to understand the driving forces behind the current and future environmental demands that might occur if demand to implement new management system. With this reference, it is important to put into account the system of a company and its stakeholders (Lozano, 2012b).

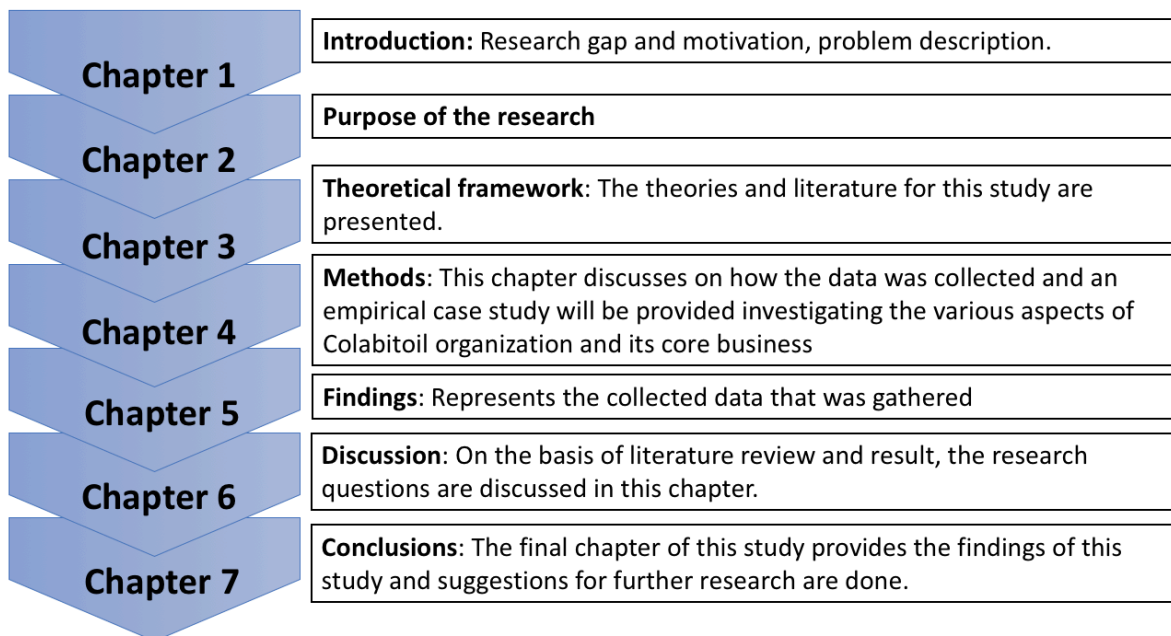
Colabitoil Sweden operates within the scale of SME. The organization is a leading player in the development of HVO diesel, renewable gasoline and aviation fuel in Sweden. The organization also strives with its vision in producing and supplying of fossil free fuel to contribute to sustainable society. However, the company intends to deepen knowledge and acquire information on current state and future trends within the industry on requirements for continuous improvement for the company environmental sustainability. In particular, the company needs assessment on environmental sustainability and determine the most suitable processes in attempt to implement environmental management systems (EMS).

From the above preceding discussion, the authors of this thesis have developed an investigation analyzing potential approach on implementation of EMS in a small company.

## 1.2. Structure of the thesis

The structure of this thesis is described as follows:

A theoretical framework will be presented based on existing literature consist of scientific articles and books. The methods section discusses on how the data was collected and an empirical case study will be provided investigating the various aspects of Colabitoil organization and its core business. Discussion based on empirical data and theoretical proposition in the context of Colabitoil organization will be presented. Finally, conclusions and recommendations are presented to finalize this thesis. The entire structure thesis is shown below in Figure 1.



*Figure 1: Structure of the thesis*

## **2. Purpose**

The aim of this thesis is to analyze the implementation of environmental management systems (EMS) in a small company.

The study area of this thesis is considered to increase future knowledge and understanding on how organizations pursue environmental sustainability towards future changes in its business environment. This thesis result aims the contribution to existing research on EMS in small companies as well as assisting the case company to be more insisting towards its own environmental performance and business development. Against this background, the following research questions have been formulated:

RQ 1: Does EMS affect Colabitoil environmental sustainability?

RQ 2: How could Colabitoil plan changes to implement EMS?

### **3. Theoretical framework**

This chapter is comprised of four sections of theoretical discussion and framework. The first section deals trend within the biofuels industry. The second section deals small medium size enterprise (SME). The third section discusses Deming (1993) cycle model on environmental management system (EMS). Finally, the last section deals with the change management Lozano (2012).

#### **3.1. Biofuels industry**

The use of biofuels has been given of high importance to achieve renewable energy targets. The European Renewable Energy Directive has established objectives for renewable energy consumption for all EU member states (EU-RED, 2009). By 2020, a target of 10% renewable energy should be fulfill in all transport sector, using mainly blended fuels (European Union, 2009b).

Sweden has a goal of 49% of renewal energy consumption, the highest of all 27 EU members and they already successfully accomplished that goal (Regeringskansliet, 2013). According to Tilman et al. (2009), there are three major problems regarding the production of sustainable biofuels to address energy, food and environmental challenges to maintain sustainable society. Some of these problems are energy ratios, land use and emissions (Diaz-Chavez, 2011; Timilsina and Shrestha, 2011). Biofuel production has been criticized and the number of life cycle assessments has also increased in order to measure environmental sustainability (Cherubini et al., 2009; Cherubini, 2010; van der Voet et al., 2010).

Environmental sustainability aspects of biofuels production are been considered and regulated. Policies in United States of America (USA Law, 2007) and the European Union (European Union, 2009b) implement the use of life cycle assessments (LCA) by conducting an environmental sustainability assessment of the production process. Moreover, using LCA method, the EU-RED (European Union, 2009b) mandates that all biofuels industry should have greenhouse gas (GHG) emissions savings at 60% reductions in January 2018 (European Union, 2009a).

Biodiesel renewability contains good energy balance and it is easy to mix with petroleum fuels. Moreover, it emits less greenhouse gasses and does not contain sulphur (Moser, 2010). However, GHG emissions from biodiesel production varies depending on feedstock types and

fossil energy intensities for feedstock farming and biodiesel production. The Sweden biofuels industry has a tax reduction for pure and high-blended liquid biofuels, the Swedish authorities have confirmed that the aid in the form of exemptions from the CO<sub>2</sub> and energy taxes will only concern biofuels that fulfils the EU sustainability criteria, as defined in Article 17(2)-(5) of the Directive 2009/28/EC of the European Parliament and of the Council. The Swedish authorities also states that Hydrotreated Vegetable Oil (HVO), as renewable diesel that has been produced from vegetable fats and oils, has to consists at least of 98 % of biomass in order to have taxes free. (European commission, 2017).

HVO has very similar chemical and technical properties as conventional fossil diesel. In the manufacturing process, advanced industrial techniques are required to be classified as effective and environmentally sustainable. It is also possible to extract fuel from the raw materials which mainly consists of animal fats from residues and vegetable oils. However, the availability of raw materials has become a major concern and challenges for biofuels industry (Greenea, 2017).

According to Ahmad et, al. (2011), feedstock evaluation is an important value when it comes to life cycle analysis in the production of biodiesel as well as the percentage of oil and yield are essential criteria in quality of biodiesel. However, the challenges in commercialization of biodiesel production is the cost of feedstock and availability raw materials in bulk scale with comparatively low cost and restrictions for large scale applications (Toro, 2010).

Producers focus on the feedstock for two major reasons. The first is to improve their competitiveness using cooking oil or animal fat that decrease green house gases emission of HVO fuel. Secondly, feedstocks such as palm oil has no a good reputation in Europe (Greenea, 2017). Exploration of waste or used oils have increasable gained attention in recent discussion among biofuels industry due to the effective elimination of disposal oils (Nurfıtriet, al. 2013).

### **3.2. Small medium-sized enterprises (SME)**

SMEs setup can be different from another in relation to number of employees, size of the company and type of industry (O’Laoire 1995; O’Laoire & Welford, 1998). According to Hillary (2000) SMEs can be defined into "*two categories of definition: operational (demonstrate working purpose) and theoretical definitions (employed to characterize the sector)*". For example, a micro organization is less than ten employees while “small” (10-49) and “medium” is consist of 50-249 employees (European Commission, 2019).

Hillary (2000) stated that 90% of most companies are SMEs industry and mostly are managed by their owners. Moreover, an annual turnover up to EUR 50 million is generated by the SMEs industry (European Commission, 2019). Therefore, the succession of small organization lies on strategic direction, belief, values, and educational background of the owner. (Mandl and Dorr, 2007). Additionally, SME owners are independent, informal, respond to short-term problems, and very flexible because of their small size and personal relationships with customers as well as their suppliers, which contributed to the role for being a successful company (ACCA, 2012).

Hillary (2000) argued that SMEs are source of innovation and entrepreneurship as well as developed competition for future businesses. According to Ghobadian and Gallear (1997) study, small-to-medium-sized firms tend to have basic control processes (such as informal evaluation and communications) and required simple planning and less standardization. In contrast, large companies are more proactive in responding to environmental concern due to their high reputation and availability of resources compared to SMEs (Eden 1996).

James et al. (1998) stated that SMEs lack resources, technical ability, time and capital which result to inactive. However, Roger (2004) argued that small firms have some advantages, such as flexibility that could lead to faster decision making for creating innovations. On the other hand, Rao et al. (2006), states that SMEs only respond to environmental concerns that is line with regulatory authorities. In reference to this, SMEs' actions are perceived as lack of commitment and irresponsible to environmental concerns. In addition, Burke and Gaughran (2006) argues that SMEs lack of knowledge on relevant environmental legislation and they are unaware of their negative impact on the environment.

Most recently, consumers are demanding that companies must engage on environmental issues, regardless of their size (Campos, 2012). Hillary (2000) argued that Environmental Management Systems enable the means of a systematic approach for managing environmental impacts. However, SMEs lack knowledge and expertise required to implement EMS (Ortiz et al., 2013). Thus, emphasis on Environmental management system in SMEs has increased due to challenges on improving their production processes but the lack of strategic initiatives is diverse (Hillary, 2004). Finally, EMS is stimulated through the recognition of its importance to sustainable economy (Campos, 2012).

### **3.3. Environmental management system (EMS)**

Environmental Management Systems (EMS) has received recognition since 1990s (Steger, et al., 2002). The British Standards was published in 1992 as the first environmental management standard (Starkey, 1998). In 1993, European Council (EC) introduced the adoption of EMAS (Wenk, 2004). Finally, ISO 14001 standard was adopted in 1996 (Honkasalo, 2000).

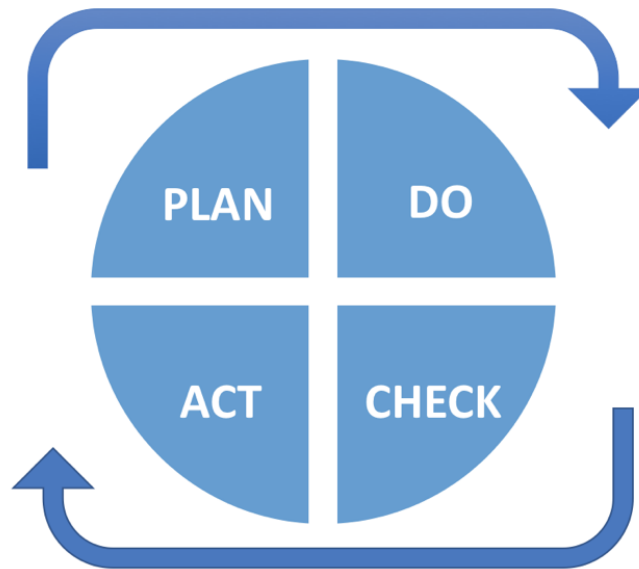
These standardized environmental management systems are systematic and structured methodologies used to effectively manage environmental issues in line with other management systems within an organization (Brorson & Larsson, 2006, p.15). According to Puvanasvaran et al. (2012), an Environmental Management System (EMS) is structured as a framework for eliminating an organization impacts on the environment and integrating environmental initiatives into all aspect of a company's operations.

An effective EMS helps companies in fulfilling their responsibilities towards meeting their environmental objectives through a proactive approach (Gbedemah, 2004). According to Ilntich et al. (1998) and Stapleton et al. (2001), an EMS encompasses the requirements of organization such as policies, goals, documentation systems, annual reports and regulatory requirements. In general, the management system serves as an administrative tool that enable an organization to manage and control the effect of its activities as well as products or services.

Environmental practitioners ensure that encouraging small and medium enterprises to implement an Environmental Management System in achieving environmental sustainability (Rao et al., 2006). According to Wells and Galbraith (1999), the adoption of ISO 14001 for SME certification ensures continuous improvement and increase competitive advantage. Aragon-Correa et al. (2008) states that SMEs can enhance financial performance through proactive environmental practices.

Environmental management system is holistically based on the Plan-Do-Check-Act (PDCA) for business process and improvement model (Stone and van Berkel, 2004; Seifert, 2005; Viegas, 2005). Zeng et, al. (2007) also argued that Deming's cycle (Plan-Do-Check-Act) is the base of standards. Moreover, Check-Act (CA) stages are the key that companies have to focus for justifying certification (Poder, 2006).

Deming (1993) describes four essential steps that should be carried out to achieve continuous improvement, shown in Figure 2 as described on processing (PDCA) steps. This procedure needs to be repeated in order to improve continuously.



*Figure 2: Deming (1993) cycle model (PDCA)*

**Plan:** This stage enables the means of conducting an environmental evaluation on how the organization activities influences the environment.

- Analysis on the organization objectives and processes as well as future plans that might interplay with the business environment.

**Do:** Enable the mean to communicate the organization objectives and goals to its employees.

- Focus on effective management control and planning.
- Provide resource to educate and training the employees.
- Implement and integrate the management system into all levels of the organization.

**Check:** Monitor the progress towards achieving the targets.

- Evaluate and ensure that the organization main objective and goals are met
- Ensure and confirm that internal audits are correctly manage.



Act: Ensure that communication and documentation are managed correctly as well as analyzing management review to highlight areas that are needed for further attention.

Figure 3 shows the illustration of environmental management system based on Deming's cycle.

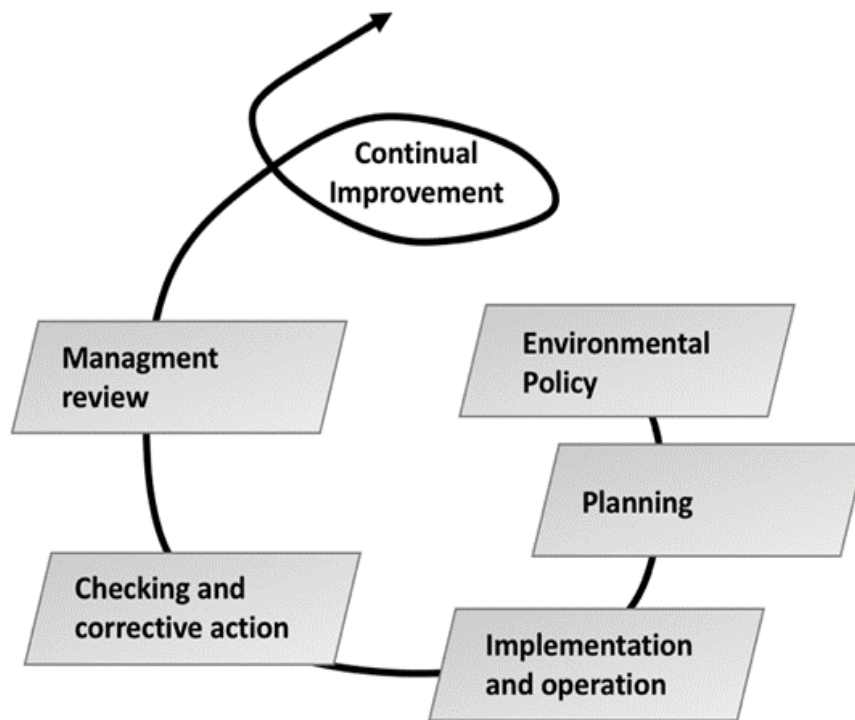


Figure 3: The continuous cycle of an environmental management system (ISO 14001:2015)

### 3.3.1. Understanding the basic function of environmental management system in an organization

Environmental management system serves to maintain and achieve two major goals for an organization environmental activities: compliance and waste reduction (Sayre, 1996). Moreover, Biondi et al. (2000) stated that the forces behind the EMS implementation in SMEs organizations lies three major motives: ensure compliance and social requirements, enhance strong competitive advantage and compliances with customer-based requirements. Additionally, companies employ environmentally friendly policy and commitment to improve their environmental performance (Psomas et al., 2011). Umweltbundesamt (2000) argued that there are lot of benefit of adopting EMS, such as better organization and documentation, enhanced plant safety, optimization of process flows, opportunity to set the example for suppliers, improved cooperation with authorities, positive and competitive advantages.

Hillary (2004) divided the benefits of implementing EMS in SMEs in two major categories consist of internal and external functions:

The internal functions are grouped in three categories: organizational, financial and employees benefits which are relatively cost saving and improvement on communication channels, knowledge and skills; and the external functions are also categorized in three categories: environmental communication and commercial benefits which are relatively response to improve environmental performance, brand image of the company and relationships with stakeholders.

Hillary (2004) also stated SMEs encounter negative outcomes after completion of EMS implementation: more resources than expected were required such as the cost of certification and time.

The implementation of EMS predicts the adoption of ISO standards. From an organization perspective, compliance is applied to fulfill the rules and regulations standards for acceptable pollution levels and serves to avoid fines. For example, failure to comply can be cost for an organization (Sayre, 1996). With this regard, it is vital to understand the purpose and functions of the Environmental management system.

### **3.4. ISO 14001 standard**

ISO 14001 standard serves to maintain and achieve is applicable for all organizations to address their environmental responsibility regardless the industry sector and structure (Montabon et al., 2000). ISO14001 is a standard designed for organizations to implement a management system to serve the purpose to execute environmental policy, implement procedures for planning and controlling (Petroni, 2001; Barla, 2007; Massoud et al., 2010).

ISO 14001 is a voluntary standard and reviewed every five years and as present 14001:2015 version. Organizations are responsible for the implementation on how it should be done. ISO 14001 enables organizations to enhance its environmental performance, following compliance obligations and achievement of environmental objectives. Poksinska et al. (2003) study indicates the main motive for the use of ISO 1400 certification in Sweden is to enhance corporate image and increase competitive advantages.

### 3.4.1. Understanding the basic function of ISO 14001

ISO 14001 is a process standard used for an organization environmental management policies and does require internal and external procedures (Feldman, 2012). The standard also serves to analyze "EMS, auditing, performance evaluation, labeling, life cycle assessment, and product standards" (Tibor and Feldman, 1996).

The standard is divided into two categories: The first framework for the management system is organization evaluation, which includes environmental auditing and performance analysis to enable the EMS implementation. The second category is an evaluation and analysis of product and process characteristics such as labeling, life cycle assessment, and environmental attribution as shown in Figure4 below:

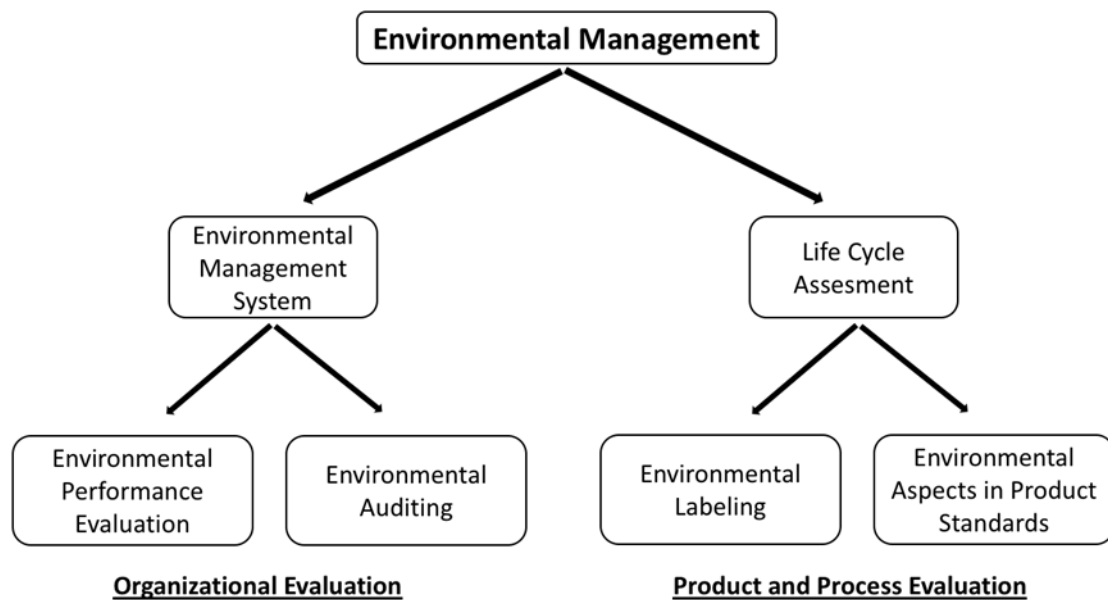


Figure 4: ISO 14001 and environmental management systems

EMS involves the integration of management processes for planning, controlling and reporting environmental performance to internal and external stakeholders. The primarily objective for documentation is to enable the means to focus on pollution control and waste minimization. (Sroufe, 2000).

ISO standards is set as the basic system of an Environmental Management System. According to Sayre (1996) and Tibor and Feldman (1996) EMS enable management to execute the following:

- Facilitate planning, controlling, and monitoring to ensure policy is compiled and maintained its accuracy for the organization;
- Execute an environmental policy appropriate for the organization which includes a commitment to the prevention of pollution;
- Implement these policies and objectives with a disciplined process of evaluating and achieving target performance levels while seeking improvements where necessary;
- Identify the legislative requirements and environmental aspects of the organization's products, services as well as activities to determine the impact, priorities, significance, and objectives;
- Develop management and employee commitment to the protection of the environment, with clear goals of accountability and responsibility;
- Encourage environmental planning throughout the entire organization's activities which includes raw materials acquisition to product distribution;
- Establish a management process to review and audit the EMS in order to identify opportunities for improvement and resulting environmental performance;
- Provide resources including training to achieve targeted performance levels on an ongoing basis; and
- Establish and maintain appropriate communications with relevant internal and external parties; and encourage suppliers to establish an Environmental management system.

The implementation of Environment management system requires an adaptation of change within the internal process of the organization. In particular, change in small organizations is a challenging issue (Senior & Fleming, 2006). However, firms have to continuously adapt in terms of cost, quality and diversity. For this reason, it is important to implement change in most effective way to achieve increased competitiveness (Brown, van der Wiele & Loughton, 1998).

### **3.5. Change management**

Lozano (2012b) stated that it is important to consider the system of the company and its stakeholders. In small firms, managers are usually involved in all processes of the firm (Gray, 2002). Consequently, managing change in a small company requires specific management skills (Winch & McDonald, 1999). This implies that the attempt to implement change and integrate new system into an organizational practice might require a high degree of commitment and leadership skills in order to manage any changes within and outside the business operation.

Company encounter some barriers in attempt to implement change. Companies are not planning their organizational changes, but planning could help them to reduce the efforts for improving their sustainability (Lozano, 2012b).

According to Lozano (2012b), the change for Corporate Sustainability follows the model that is shown in Figure 5, this model integrates the model of Anderson and Ackerman Anderson's (2001).

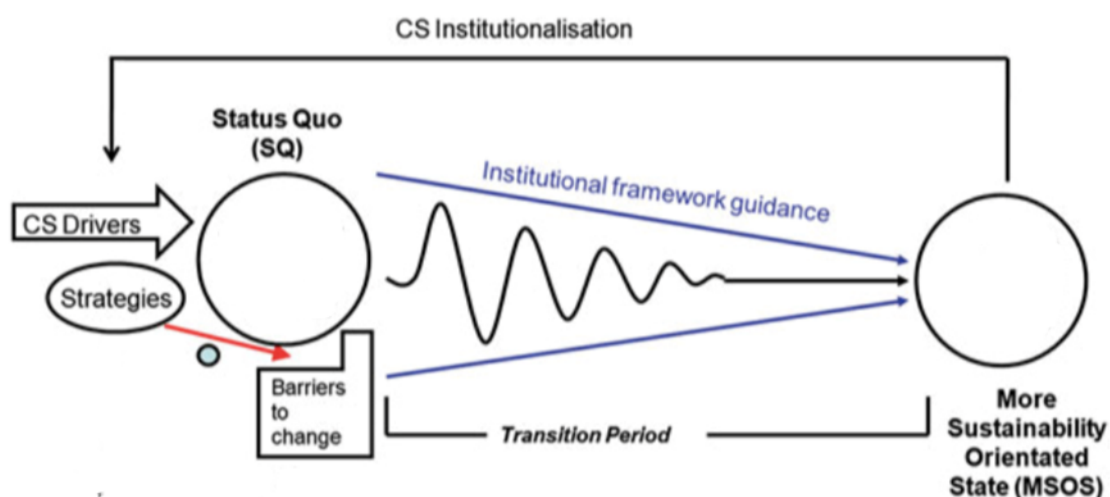


Figure 5: Orchestrating change for corporate sustainability model. Source: Lozano 2012

This model shows how a corporate can change from a Statue Quo (SQ) to a more sustainable oriented state (MSOS). Corporate sustainable drivers can help the change from the unsustainable SQ towards producing more sustainable products and services. However, there are some barriers that appear when a company wants to change, and companies should identify them and apply appropriate strategies to overcome them (Lozano, 2012b).

Finally, Wenk (2005), states that organizations still have a diverse perception regarding EMS implementation as applicable source of sustainability planning. On the other hand, Robert et al (2007) argued that EMS can be integrated into strategic framework for sustainability principles. Additionally, MacDonald (2003) argued that integrating sustainability in EMS requires significant changes in existing organization planning.

### **3.6. Summary of the chapter**

In this chapter, the authors of this thesis have acquired knowledge and discussed the driving forces behind organization pursuit for environmental objectives as well as the need of effective management system to achieve environmental sustainability. A set number of fundamental discussions and framework on environmental sustainability and EMS implementation is presented in Chapter 3 by advocates (see Deming, 1993; Rao et al. 2006; Hillary, 2000, 2004; Steger, et al., 2002; Brorson & Larsson, 2006; (Stone and van Berkel, 2004; Seifert, 2005; Viegas, 2005; Zeng et, al.2007) from different perspective in existing literature.

In order to achieve the aim and main objectives of this study, the authors believe that it vital to understand the case company internal and external business environment. For this reason, three frameworks are chosen from the above theoretical framework. Within this elaboration, Colabitoil business practices is determined by some external forces that cannot be controlled compliances and all requirements to achieve environmental sustainability. For this reason, the authors found the framework of Deming's cycle (1993) model for EMS suitable in analyzing Colabitoil business operation and enables the means to answer the research questions developed in this thesis.

Finally, the main objective of this thesis to analyze the implementation of environmental management systems (EMS) in Colabitoil organization. The organization also needs to understand the driving forces behind the current and future environmental demands that might occur if implements new management system. Additionally, Colabitoil tends to implement environmental sustainable strategies for continuous improvement within the organization which requires re-evaluation address current as well as future environmental trends to decrease future risk. It is vital for Colabitoil management analyzes business environment and integrated strategies for their future business. For this reason, the authors of this thesis found Lozano (2012b) argument and proposed model on change for Corporate Sustainability by Anderson and Ackerman Anderson's (2001) suitable for change management in order to Colabitoil planning and practices in relation its business environment.

## **4. Methods**

In this chapter the methods used to achieve the purpose and objective of thesis. The following discussion is presented to explain the chosen methods and how data is collected for this study. Furthermore, the research methodology is developed to give a descriptive background on answers to questions in the following scale (Kothari, 2004:8). The data analysis framework of this research is considered in three objectives which are:

- Analyzing potential approach on implementation of Environmental management system in Colabitoil organization;
- Evaluating Colabitoil business environment in relation to environmental sustainability; and analyze how Colabitoil could manage the process of change.

Firstly, the authors of this thesis will present methods applied and discuss how this study was conducted and the research questions were formulated. Emphasis and background discussion on research process, research approach and data collection. Data analysis is presented to illustrate how the authors of this thesis investigated the research. Finally, validity and reliability of data will be discussed in the end of this chapter.

The main objective of this thesis to analyze the implementation of environmental management systems (EMS) in Colabitoil organization. The organization also needs to understand the driving forces behind the current and future environmental demands that might occur if implements new management system. Additionally, Colabitoil tends to implement environmental sustainable strategies for continuous improvement within the organization which requires re-evaluation address current as well as future environmental trends to decrease future risk. It is vital for Colabitoil management analyzes business environment and integrated strategies for their future business.

### **4.1. Research approach**

For the thesis objectives, the authors have found case study approach most suitable. Due to this the research questions are structured as “How” questions, which are required forms for conducting a case study. The formulation of all the two research questions can be observed in this study. This structure of formulation is in line with Yin’s (2009) argument that states, “case studies are preferred method when “how” or ”why” questions has been posed, when an

investigator focuses on single case and wants to understand a contemporary phenomenon in-depth with real life context” (Yin, 2009, p. 16).

In order to carry out the case study, qualitative research approach has been adopted for this research. Denscombe (2010) states “qualitative research is primarily associated with research strategies such as case studies, grounded theory and research methods such as interviews and documents” (p.273). In the process of developing the case study of Colabitoil, an empirical research was conducted for data collection and analysis and the full process of conducting this case study is shown below:

Firstly, the planning stage of this thesis began with meeting the case company CEO who is an employer to the co-writer of this thesis. The scope of this thesis and topic were discussed and determined. A grant was given by the organization to further this research. The focus in this study is to analyze the implementation of environmental management systems (EMS) in Colabitoil organization. After several consultation with the university supervisor and examiner for the permit, the scope of to this research was designed. The full planning process of conducting this case study is presented below the following Figure 6:

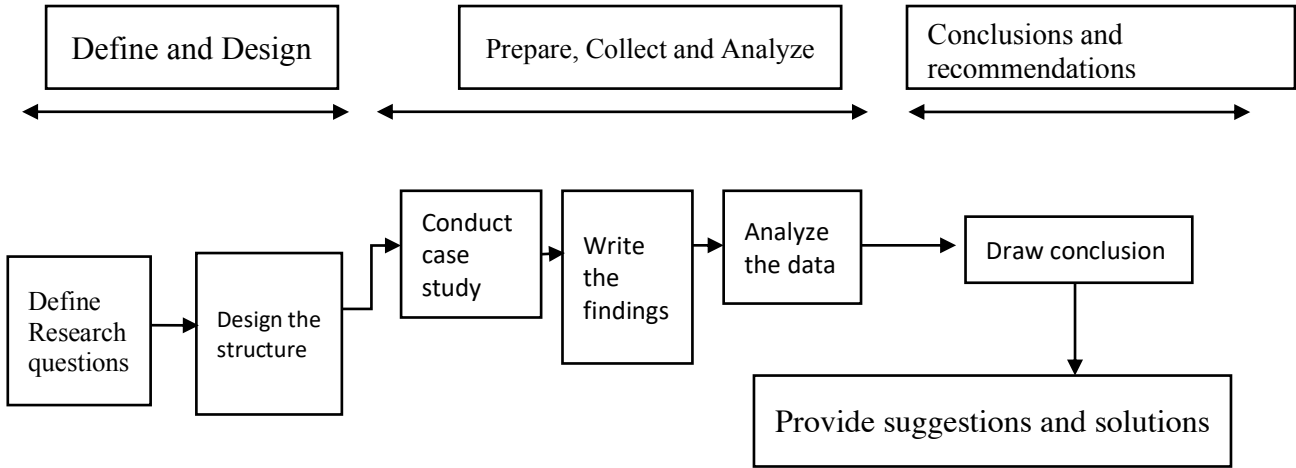


Figure 6: Process of conducting a case study. Authors own elaboration.

Based on this background, two research questions are constructed to serve the objectives of this study which are: RQ 1: Does EMS affect Colabitoil environmental sustainability?

RQ 2: How could Colabitoil plan changes to implement EMS?



The respondents chosen for the interviews in this thesis were carefully selected within Colabitoil organization. The respondents were chosen based on their position in the company and their competences.

## **4.2. Data collection process**

Qualitative data has been used to carry out the case study of this thesis in form of secondary primary and sources of information. The primary source of information is collected from in-depth interviews, observation, documentary and internet information. The internet and documentary information comprise of relevant data collected from the Colabitoil business environment such as annual report and press release. This supports Ghauri and Grønhaug's (2002, p. 171) statement that says: "case study often involves data collection through multiple sources such as verbal reports, personal interviews and observation".

### **4.2.1. Secondary data**

Secondary data was collected from previous existing literature comprises of books and articles. This implies that the study of the thesis is purposive in nature. The authors also meant that knowledge was acquired by reading scientific articles and books on environmental sustainability and management system. This is done to create a foundation in processing our research design on how to approach the problem description and research questions in this thesis. The secondary data will be used later in the discussion section. This will be done to establish the process of interrelating empirical discussion and theoretical proposition developed in chapter three and as well as answering the objective of this research to derive a conclusion.

### **4.2.2. Primary data**

Primary data was collected through interviews with the managers of Colabitoil. Five interviews were conducted in the semi-structured form. The chosen method was applied in order to obtain accurate information and opinions of Colabitoil and to analyze its environmental sustainability. Five were interviewed and all respondents are in top managerial positions. The interviews were conducted through personal and e-mail communication. In order to gather information with the key persons within the management, semi-structured questionnaires were used. Each respondent had a major position and key role in the management group such as business intelligence and sales marketing department. 19 open-ended questionnaires were prepared as a guide for the conducted interviews. These questions were formulated from the theoretical framework in chapter three. The questions were intended to verify information presented in the

secondary data and as well as to achieve the objectives of this thesis. All the interviews were conducted in May 2019. The interview questions can be found in the appendix.

Respondents are from the following departments:

- Business intelligence department
- Strategic management department
- Sales and marketing department
- Key account management department
- Financial management department

The authors conducted face to face interviews through personal and email communication. In the process of conducting the interviews, the authors of this thesis encountered challenges. The challenges were related to the time availability. The process of conducting interviews took time due to unavailability and tight schedules of the respondents. In attempt to conduct an interview via Skype with key account manager respondent, the authors encountered technical difficulties. The interview was later conducted completely in written form; as for another a re-schedule plan was made for a new interview time with operational manager which went successfully.

Each interview lasted for 90 minutes which were recorded and later transcribed. The data that were collected includes official information as well as personal opinions of the respondents about the case company. Interviewing the employees one at a time also made it easier to control the interview-situation and made it easier to organize the recorded data and transcribe the interviews as there was only one person speaking at a time.

*During the interview, it was guaranteed that any information they provide and perceive to sensitive was to be kept confidential. At the same time, it was generally agreed that the findings of the study will be revealed to several people internally within Colabitoil organization and the university involved in evaluation of the thesis. Therefore, the anonymity and privacy of the interviewees will be considered, and pseudonyms will be used in the case study. Respondents will be given in form of pseudonym (interviewee with number follows in a chronological order. For example, interviewee #1, #2, #3, #4 and #5).*

To analyze the interviews, the authors used coding, as the responses of the interviewees were placed in sections such as (organization objectives, customers suppliers, products, reporting etc.) which enabled the mean to analyze the similarities and differences between answers.

### **4.3. Data analysis**

According to Yin (2009, p.127) data analysis consists of examining, categorizing tabulating, testing or recombining evidence in order to draw empirically based evidence. As a result, analysis of case study can be difficult because techniques are not properly defined. Yin (2009) suggested four strategies that are relying on theoretical propositions, case description, using quantitative and qualitative data and then examining the empirical evidence based on the theoretical propositions. In order to overcome any kind of circumstances, a case study must follow a general analytical strategy by defining what is necessary to analyze and why. All the four strategies underlie the analytical techniques for a case study analysis. These techniques also address issues with internal and external validity when conducting a case study.

Firstly, the authors used a qualitative data approach. In process of this analysis, data information that were collected from the case company respondents were later transcribed and interpreted. The interpretation of the interviews was later summarized and presented in a descriptive form as a source for empirical evidence.

Based on the theoretical framework developed in Chapter 3, the following model were used to construct and structure to analyze the data. Furthermore, in process of this analysis, the Deming's cycle theoretical model was used to examine Colabitoil internal and external business environment and interplay the empirical data acquired. The authors have decided to focus on relevant discussion on PLAN and DO Deming (1993) model for environmental management system to analyze that internal and external Colabitoil organization and its business environment as a single case of its own which includes the biofuels industry where the organization operates.

The structure of this thesis analysis is presented as follows:

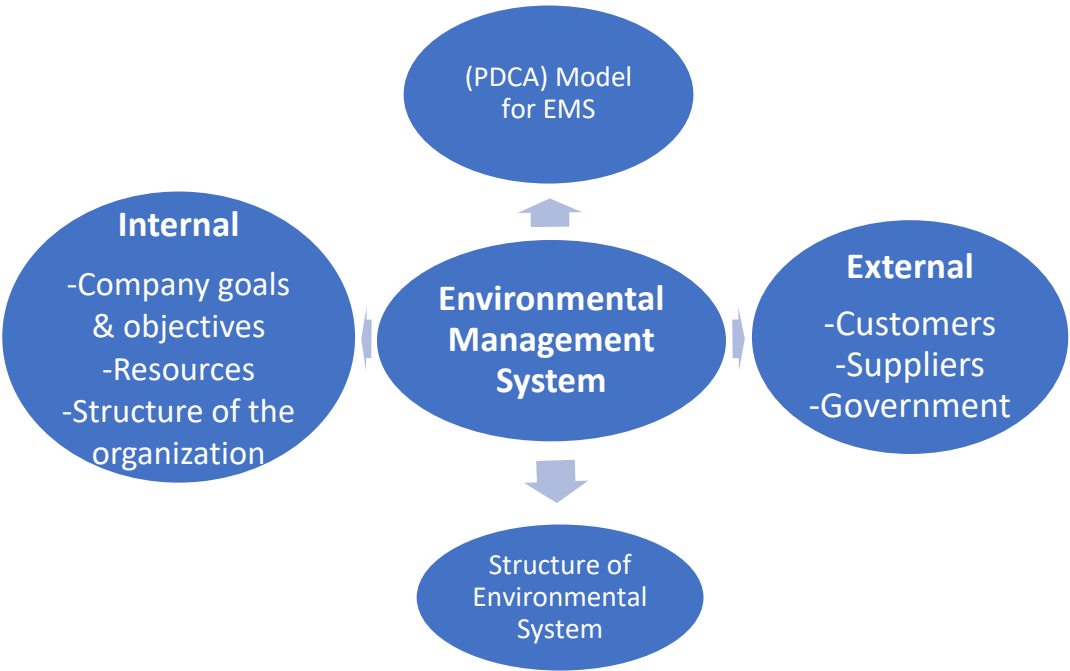


Figure 7: Structure of this thesis analysis. Authors own elaboration.

The analytical tool of EMS was used to visualize the environmental performance level of Colabitoil and its entire business environment. The Deming's cycle (PDCA) procedure used to demonstrate how Colabitoil can employ environmental sustainability system in its goals and planning in order to improve their environmental performance as well increase a higher competitive advantage in biofuels industry. In particular, the authors discuss biofuels industry and renewable production that interplays between the companies and its industrial environment. Deming's continuous cycle model (PDCA) ISO 14001:2015 on environmental management system is used in analyzing external environmental sustainability to interplay Colabitoil environmental performance on suppliers, customer and compliance requirements. These frameworks create possibilities for a firm to adopt new ways of approaching environmental sustainability and analyzing its business activities.

Finally, the authors will briefly answer the research questions of this study in the conclusion part and discuss the limitations and its implications of this study. Recommendation are presented in form of suggestion at the end of the thesis.

#### **4.4. Validity and reliability of this study**

According to Yin (2009) data must be validated or constructed according to research design and methods. The data used for a research must be validated and it is vital that the authors state that the findings are "true". Otherwise the study is lacking a validity aspect. Within the background of this study, previous empirical study findings have been diverse on how companies practice environmental sustainability and why they need to implement environmental management system. Interview is conducted to provide reliable information that was used as a primary data for this research. According to Denscombe (2007) there three general quality principles for a research which are validity, reliability and generalizability of data.

*Validity* refers to precision of the data and it is involved with a question, whether the collected data is appropriate what it comes to research question and purpose of the study (Denscombe, 2007, p. 296). The authors were able to demonstrate approaches that are connected to the two research questions in this study. In order to complete this research, information acquired during the interview with the respondents, annual reports, website information and observation were used for this study.

*Reliability* is concerned with the research instrument and whether the study has been conducted in a manner, which is considered to be neutral and objective. With the use of case study, a qualitative approach is found most suitable. The authors of this thesis made sure the respondents could provide reliable information that was used as a primary evidence for this research. The authors approached the questions in a way that would provide the most reliable data. This allows the authors to focus on the main objective in order to discuss and answer the research questions of this thesis. For example, the interview guide questions (4-11) were formulated to capture the Colabitoil goals and environmental strategies such as policies and objectives on environmental sustainability. Additionally, questions (12-19) try to capture their environmental documentation and the next steps of Colabitoil' business. The interview guide questions are based on the knowledge that the authors had acquired from the existing literature during the process of theoretical framework formulation. This process preceded the structuring of the interview guide

questionnaire; therefore, the authors believe that this adds the reliability to the thesis by using multiple methods in collecting data.

*Generalizability* responds to the external validity of the study and whether the results can be applied to other occasions that are explaining the phenomenon in different surroundings. Yin (1994) argues that conducting a case study with deductive approach is theory driven. This is in line with this study because the empirical findings are analyzed and compared towards theoretical framework. However, it is concerned whether the study can be used as an universal example rather than being unique to a particular case (Denscombe, 2007:296). In the case of this thesis, the results are not generalizable as the study only considers one relatively small organization, Colabitoil Sweden AB. The empirical data were analyzed to find the relation between existing theory and practical operation within Colabitoil business activities. Each interview questions asked were formulated to capture comprehensive details of information in order to answer the research questions and purpose of this thesis.

Denscombe (2007) argues, that *objectivity* is referring to the absence of bias in the study. The study must be neutral when considering the researcher's influence on the result. The authors could observe the interviewees when they spoke and there is no reason to believe none of them was lying. Thus, authors acknowledge the implication of confidentiality and bias in this study. The co-writer of this thesis is also an employee within the organization, but all information and data processes has been handled objectively and independently, therefore there is no bias from the side of the authors. In case of confidentiality, the data that were collected includes official information as well as personal opinions of the respondents about the case company. Respondents was given in form of pseudonym interviewee with number follows in a chronological order. For example, interviewee or respondent #1, #2, #3, #4 and #5). The primary data was relying on books and academic articles that are believed to be bias-free.

Finally, Colabitoil Sweden also offers range of goods and services with a comprehensive portfolio of products that enables customers to lower their carbon footprint by combining high quality and knowledge know how in product solution processes. The main task of Colabitoil Sweden is to continuously improve to enhance sustainable development and performances in its current business practices, particularly in environmental sustainability through helping their customer in translation from fossil fuel to " Fossil free fuel". Based on this ground, the authors of this thesis believe manager in the company has a high proficiency and specialization on their work field, which can be a guarantee of the validity and trustworthiness of the data obtained.

#### **4.5. Background information of case company**

Colabitoil Sweden has been operating for about six years. The organization has implemented local management system based on internal concerns and legislation requirements to adapt to current environmental sustainability development.

The company leads the development of renewable diesel with its first pilot plant for the production of HVO100 made from vegetable oil. In progress of growth, the company has fifty-five employees and the group is generated in Fiscal Year 2018 a revenue of 549 MSEK in Sweden. The organization was established in 2013 and operating within the field of solution industry with production plant capacity of 1M liters of biodiesel. Colabitoil Sweden also offers range of goods and services with a comprehensive portfolio of products that enables customers to lower their carbon footprint by combining high quality and knowledge know how in product solution processes.

Colabitoil Sweden aims for continuous improvement to enhance sustainable development and performances in its current business practices, particularly in environmental sustainability. Today, Colabitoil Sweden is listed on Spotlight stock market by name (COLAB) with a main goal of developing and marketing the fossil-free fuels of the future across Sweden as well within Europe.

## **5. Empirical Findings**

The following section includes relevant discussion of the finding based on the interviews conducted by the authors of this thesis. 19 questions were asked to respondents during the conducted interviews. The first two questions are background questions that identify the respondent's position, working duration and professional experience within Colabitoil organization. The following 17 questions were asked to capture Colabitoil internal and external business environment as well as practices towards environmental sustainability. All respondents are on managerial position in various area of responsibilities such as business executives, business developer, marketing and sales representatives.

### **5.1. Interview findings**

#### **5.1.1. Colabitoil internal business environment**

Colabitoil activities are influenced by its business goals and environmental sustainability strategy. Respondents state that Colabitoil is working with environmental issue both on internal and external level. The main goal of the company is to be producer of sustainable fuel to help other companies and people to make easier choice to translation from fossil fuel to fossil free fuel. Colabitoil practices environmental sustainability, the organization has been working with environment issues in different areas of its business environment. For example, Colabitoil is working in all aspects of the organization through strong advocate of translation from fossil to fossil free, distributing and selling the products as well as marketing campaign overall Sweden (Interviewee #1-5).

In Colabitoil, employees and suppliers are encouraged to only use vehicle with fossil free as source of transportation (Interviewee #1-3). According to the respondents, the organization works with environmental issues on a daily basis and delivers environmental products to the transport sector, develop renewable products through research and work on sustainability for their customers and owners. Furthermore, Colabitoil has three core business areas, selling and distribution of fuel to customers and gas stations, production and selling technology license. The manager states that the organization aims to have local production, feedstock to local consumption in nearest future. Thus, at the moment they are not able to produce enough and it takes a lot of money, for this reason the organization decided to offer other companies technical license to produce with their own technology (Interviewee #1-4).



Colabitoil business environment has been influenced by internal and external factors where it operates. The organization has been in the fuel industry over five years and leads the development of renewable diesel with owned pilot plant for the production of HVO100. Respondents stated that HVO leads the transition to a fossil-free environment and in order to address environmental issues in all areas of business, the organization has implemented local management system based on internal concerns and legislation requirements to adapt environmental sustainability (Interview #1-3). As part of strategy environmental issues is of most importance and as part of decision-making, establishing on continental Europe, the Environmental Impact Assessment (EIA) and feasibility considerations are obligatory (Interviewee #5).

The organization have a system on how to handle everything and the government evaluates the system and process for environmental qualification and issue a sustainability certificate on how to work internally (Interviewee #1-2). Colabitoil employs environmental policies, routines and protocols on how things should be done correctly in all areas of our operations (Interviewee #1-4). For example, the company have to fulfill all requirement for renewable sustainable solution for its production and ensure that the feedstock for production are certified as well as it fulfills all renewal energy directives.

Respondents also indicated that Colabitoil is in the process of political dialog with municipalities and regions for the lifting the importance of sustainable fuels and provide environmentally friendly alternative fuel to public buses. Colabitoil also offers goods and services with a comprehensive portfolio of products that enables our customers to lower their carbon footprint by combining high quality and knowledge of our know how in product solution processes (Interviewee #1-4).

All distributions are with renewal fuels, the organization help customers and car companies to change from fossil to renewable fossil free. Colabitoil aims to find local feedstock and input that could give the means to create feedstock from such biomass. Colabitoil Sweden aims for continuous improvement to enhance sustainable development and performances in all business practices (Interviewee #1-2). According to respondent #3, all employees are expected to practice and live up to how the organization advices their customers and suppliers on daily basis in all areas of their business activities.

When asked about personnel in charge of environmental issue in the organization, the managers gave diverse opinions. For example, respondent #1 states that the organization have personnel that is in charge of environmental issue. Respondent #2 and #4 states that the organization don't have anyone in charge addressing environmental issues. However, respondent # 3 states that the overall responsibility lies with the CEO of the company with regards to various departments' petrol stations and logistics/transport, some responsibility lies with each department manager. Respondent #5 stated yes in general, as it is part of the company's value, but specific no there is no one in charge to address environmental issues.

Respondents 1-3 indicated that the main driving force concerning environmental work is the credibility for their renewable fuel products as well as being producers. Respondents # 4 states that Colabitoil evaluates environmental issues and their impacts of their products and services through ongoing re-evaluation related to personal knowledge. Thus, evaluation of their products is conducted by third party, partnership and authority (Interviewee #2). In addition, respondent #1 states that Colabitoil also conducts evaluation their customer fuel consumption and issue certificate on the reduction of emissions.

The majority of the respondents stated that have an environmental policy but has not been revised and when it comes to Colabitoil specific actions to prevent pollution, respondent indicates the organization have protocols and routines due to environmental approval. For example, respondent states that #1 *"We have different preparedness's for where in the chain the pollution can occur. For logistics, an action plan for emissions at hose breaks and in production we have oil separators"*. Respondent #3 states that all filling stations includes safety systems such as measurement and alarm system if the volume drops for some reason without any customer activities and same about water in the fuel.

On the other hand, empirical findings on environmental tools indicated that the leaders and management of the organization recognize the need of environmental management system. The respondents indicated that there are no environmental management tools, but the management are currently reviewing the decision. However, a systematic approach is employed with the support of instructions and protocols given by authorities such as MSB (Swedish Civil contingencies Agency) for running the stations. For example, respondent #3 states that the logistic department security advisor that supports with training and permits. Furthermore, respondent #2, states that the organization has owned electricity, wind power and acquired green energy into the process and produces hydrogen gas for their production. For raw material,

waste material is the main focus and it affects the price of the product. For example, Colabitoil gets a higher price of their products because of high CO<sub>2</sub> reduction value. For this reason, Colabitoil continues to strive for the best feedstocks. Additionally, the respondent further explained and illustrated how Colabitoil generates and practices environmental sustainability and contribute to society. The company produces three different products in the same process from Ethanol, and the products have zero impact on climate (Interviewee #2). The following production processes is presented below:

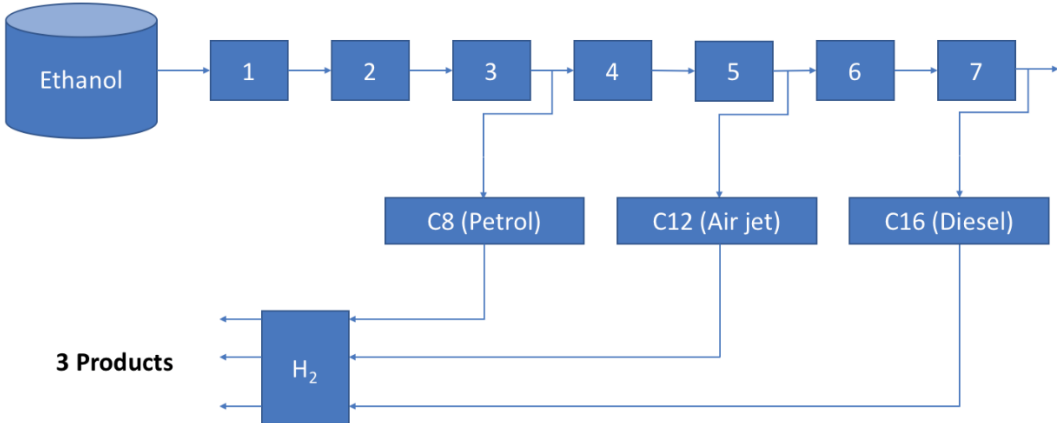


Figure 8: Production of three different products in the same process

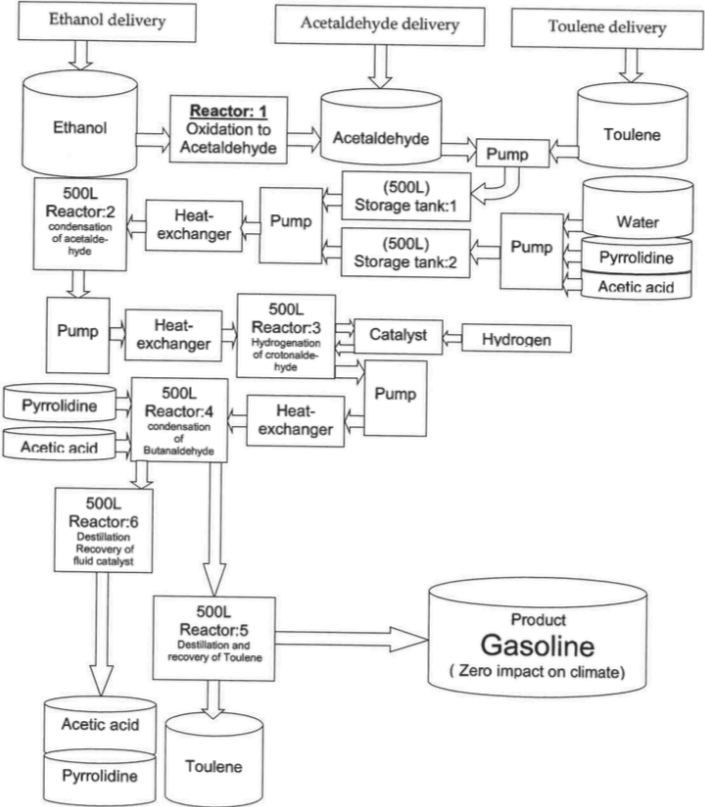


Figure 9: Production of zero impact on climate product

The above mentioned Figure 8 and 9 are presented to explain the process of producing renewable fuel from ethanol and why HVO is preferable in relation to other available fuel. Empirical findings indicated that the technique is a proven catalytic reforming of ethanol and free fatty acids. Both propellants have excellent performance with high energy content and cloud temperature of -70 degrees. The renewable gasoline can replace fossil fuel without modification of engines with retained power. The hydrogen-treated vegetable fats are mainly from waste products. The technical terms for “hydrogenation mean that break of vegetable oils into smaller pieces and get more fluid product at the same time. The unsaturated bonds are saturated to produce a stable end product.

HVO100 is pure hundred percent renewable fuel and completely compatible with fossil diesel. This product contains no aromatic or polycyclic hydrocarbons, which significantly improves the environment. HVO100 also meets the standards ASTM D 975 and EN15940 with the highest rating and perceives to be most environmentally friendly fuel. The European standard EN15940 applies to all diesel engines from June 2016. With HVO100 in all diesel engines, no changes are needed and the product can be mixed with regular diesel.

With regards to strategies that addresses environmental issues, majority of the respondents indicated that Colabitoil employs and practices environmental initiatives in various dimension of their business activities. For example, respondent #1 stated that they specify the CO<sub>2</sub> reduction value of their sold products and provide figures on how much carbon dioxide their customers have reduced with their travel.

The majority of the respondents indicated that Colabitoil acquires a sustainability certificate from the Swedish Energy Agency regarding their trade and raw materials. All business activities of the company are based and driven by sustainable strategy and sustainable society starting from the production to the process and end products (Interviewee #1-4). Most importantly, sustainability in what kind of feedstock's is used, how it is handled and processed because it is vital for the company that everything have to be environmentally sustainable and correlated with the economy because if not 100 percent sustainable it is not profitable for the organization. The highest CO<sub>2</sub> reduction value, the higher is the price just like same interest sustainability and profitability. For this reason, Colabitoil investment in research and development to aim the next generation of feedstock (Interviewee #1-2). Empirical findings on corporate environmental objectives indicate diverse opinions. For example, majority of the respondents stated that there is no such document. However, respondent #2 stated that there are protocols and routines as

well as an agenda to revise. On the other hand, respondent #5 stated that all documentation is related to corporate objectives, and all reports or parts of decision-making relates to objectives.

The empirical finding in regard to what kind of change to consider for the organization in the nearest future, the managers acknowledge the need for change management. Changes such as the need to fill in personnel with responsibilities in some parts of the organization vacancy. Presently, the organization structure has a management group, sales department, logistics, economy in separate groups. During the last five years, the organization has expanded and huge increase from two to fifty-five employees. There is a need to get employees more involved in the process and communicate our goals and vision to our customers in a better way as well as to target and implement a strong image in the organization. The management is also looking for a new general business system that can manage all data in the system such as internal and external information and documentation. For example, respondent #2 is a business developer in his role of responsibilities, the call for action *is* continuous development in all kind of business for the company by finding new opportunities, new solutions, get the tools and putting in the hand of the other employees in the company. Additionally, respondent # 3 and 5 stated that organizationally, these responsibilities lies on board of directors to make good decisions for investments and market development.

### **5.1.2. Colabitoil external business environment**

Colabitoil organization is influenced by its external business environment. Majority of respondents states that Colabitoil is working with environmental issue on external level. Respondents indicated that Colabitoil provides environmental information and data sheets for their products. For example, safety data and product sheets are provided quarterly in arrears to issue the CO<sub>2</sub> reduction value of the products delivered to customers (Interviewee # 1-4). In regard to empirical findings on whether environmental report is submitted on a regular basis to any official authority and what kind of environmental regulations may applicable to Colabitoil, majority of the respondent stated that the organization submits report to the authorities. For example, the Swedish Energy Agency and the County Administrative Board. Colabitoil also supplies information and reports such as statistics, reports on what kind of volume are highly recommended to submit. Colabitoil has an environmental permit that is demanded to live at the top, which shows what and how much capacity can be handle in the production. The company is subjected to many different environmental requirements from various authorities ranging from what applies to their production, tank facilities and transport. For example, the logistics,

production and gas stations requirements and regulation are very strict. In addition, the government classified their renewal product like a normal diesel, so the requirements are higher.

Colabitoil next step to become more environmentally friendly and how the organization consider the environmental impact of their suppliers shows that the company is already an environmental company and run all transports on renewable fuels which enable the organization to procure other services through requirements against suppliers. The next step is production and material resources, mode of production, transportation. Moreover, majority of the respondents indicated the company is planning to expand its own production and supply more products as well as acquiring more companies.

Colabitoil focuses on developing the organizational structure and conduct research for their production development to generate new technology concepts. People are changing to renewal fuels and there are several things to think about in a next step. For example, respondent #3 stated that the organization is considering to hire an environmental coordinator mainly for the environmental permit to build a large production in Norrsundet but it can also be implementation of an industrial system such as certifications because the organization need to fulfill a lot of requirements. Respondent #2 Colabitoil also considers the environmental impact of their supplier and places demand to fulfill the minimum requirement to acquire tax free.

The major external influence for Colabitoil is governmental regulation "*Fossil-free Sweden*". Respondents #1-5 refers to CO<sub>2</sub> emission regulation that will take place in 2020. The goal is that Sweden should be fossil-fuel independent in 2030. Presently, HVO got its major breakthrough in Sweden and internationally as the foremost fossil-free fuel. The demand for HVO is very strong in Sweden fuel market as well in Europe. Moreover, Colabitoil contributes and enhance major transition to a sustainable society with its own production plant, facilities and service stations through sales. Colabitoil also extends its collaboration with corporate and private customers to enhance sustainable distribution. The demand from the market is considerably greater than the supply. The need for HVO is expected to be large in the foreseeable future.

*Consequently, Colabitoil is more vulnerable to environmental factors particularly to raw materials.* Empirical findings indicated the fuel industry is facing major changes and the quest on demands for renewable fuels are increasing every day in Sweden. The use of fossil fuels currently accounts for more than 30 per cent of Sweden's total energy use. According to the all

respondents, the most vulnerable factor is the classification of the feedstock on what is sustainable because it is different in every country, and which feedstock, waste or bio product is sustainable for production and how to calculate feedstock reduction value, because this affects the price of the end product. However, the demand for environmental fuels is large from public administrations, the transport industry and mostly companies and private individuals want to contribute to a sustainable transport system (Interviewee #1-3).

According to the top managers, Colabitoil encounters a certain degree of vulnerability on how to buy the certified feedstock, measure accuracy on renewable energy directives as well as handling the process due to all the numerous requirements for renewable services and taxes. Consequently, government decisions are not correct and most of the time are unstable, and the large companies with a lot of money are trying to guide the politicians. Although all governments in Europe are more into reducing CO<sub>2</sub> but the exact road is diverse. Hence, there are a lot of raw materials and a broad range of possible feedstocks, but it is vital to know what is the best for what market and technology to enable flexibility in decision making. For Colabitoil, it is vital to ensure that all certified feedstock and handling processes are controlled by procedures until the final product to ensure all requirements are fulfilled; otherwise, the organization cannot continue the business due to added taxes on top of the fuel which could result in threats to the whole business. The government is changing a lot and it is difficult to find the best solution. Too many variables are changing all the time. The respondents argued that clear rules to invest money and risk capital, build production plants are appropriate for the business future. For example, a long-term strategy from the politicians then it will be easy for investors to know the rules in the long term. For this reason, it is important to know the road and the rules of the game twenty years ahead. Finally, the organization needs to improve its production capacity and cost efficiency. According to the development manager, Colabitoil is building the foundation and conducting different kinds of investigations on what is the best way to go for acquiring the best feedstock, examining what the market wants to be more effectively and flexibly in the production of future products despite the uncertainty on future tax reductions due to instability in government decisions (Interview #2).

In the following figure is shown a summary of the important points in which the respondents answered the same:

<b>Important points which the respondents agree</b>	
Internal issues (strategy, objectives policy...)	<ul style="list-style-type: none"> <li>- Colabitoil is working with environmental issue both on internal and external level (Respondents 1-5).</li> <li>- Colabitoil activities are influenced by its business goals and environmental sustainability strategy. The main goal of the company is to be producer of sustainable fuel. (Respondents 1-5).</li> <li>- The organization aims to have local production, feedstock to local consumption in nearest future. (Respondents 1-5).</li> <li>- To address environmental issues in all areas of their business, the organization has implemented local management system based on internal concerns and legislation requirements to adapt environmental sustainability. (Respondents 1-3)</li> <li>- They have an environmental policy, Colabitoil employs environmental policies, routines and protocols on how things should be done correctly in all areas of their operations (Respondents 1-4).</li> <li>- They are working with environmental issue in all aspects of the organization, and the strong advocate of transition from fossil to fossil free, distributing and selling the product as well as marketing campaign in overall Sweden (Respondents 1-5).</li> </ul>
Products	- Regarding to their products, they have safety data sheets and product sheets and also issue the CO <sub>2</sub> reduction value of the products (Respondents 1-4).
Suppliers	- Their organization consider the environmental impact of their suppliers. They need to know the traceability of the feedstocks (Respondents 1-4).
Reporting	- They submit a report to the authorities, the Swedish Energy Agency and the County Administrative Board (Respondents 1-4).
Governments regulations	- They refer to "Fossil-free Sweden" and CO <sub>2</sub> emission regulation that will take place in 2020 and the goal is that Sweden should be fossil-fuel independent in 2030 (Respondents 1-5).

Figure 10: Important points in which the respondents agree.



## 5.2. Observation and documentary findings

Colabitoil Sweden AB was established in 2013 with a production capacity of 1M liters of biodiesel HVO. Presently, the company leads the development of renewable diesel with its first pilot plant for the production of HVO made from vegetable oil (Colabitoil Sweden AB, 2019).

The company has expanded with fifty-five employees and covered by subsidiaries within property, production, fuel production and tanker facilities as the organization also provides companies and consumers with renewable fuels. The range of goods and services enables customers to lower their carbon footprint by combining high quality products with good service (Colabitoil Sweden AB, 2019).

Colabitoil Sweden AB has signed an exclusive agreement with Organofuel Sweden AB for global licensing for the production and sale of renewable Aviation Fuel and Renewable Petrol. The agreement is exclusively fifty years and includes the production of renewable Aviation Fuel and Gasoline on Organofuel's for international patent-pending technology solutions. The assigned agreement also includes rights to entrusted with the promotion of trade license to other bio refineries to produce the fuel. This agreement is of great importance for Colabitoil's future development. Since autumn 2018, focus has been placed more on the Swedish and European market (Colabitoil, 2019) Today, Colabitoil Sweden AB is listed on the Spotlight stock market by name (COLAB) with a main goal of developing and marketing the fossil-free fuels of the future across Sweden as well within Europe (Colabitoil, 2019) With this strategy, the foundation for Colabitoil method for hydrogenating vegetable oils was established and commercialized.

The organization builds future fuel solutions for the production and delivery of the premium fuel HVO100 by replacing fossil diesel with renewable HVO with its own production on a smaller scale. The technique is a proven catalytic reforming of ethanol. Both propellants have excellent performance with high energy content with a cloud temperature of -70 degrees. The renewable gasoline can replace the fossil without modification of engines with retained power (Colabitoil, 2019).

The authors of this thesis observed the exchange of knowledge and transparent communication between key board members, employees and customers as well suppliers regarding Colabitoil future production development and goals. There is a close relationship and open dialogue on how future plant projects. The promotion of products and services are carried out on monthly

basis to bring awareness of their product which significantly improves the consumer environment behavior. Internally, meetings are conducted once a week for employees' reflection, feedback and inputs.

Presently, the company has increased their geographical presence through international partnership and new establishments increase in sales as well as existing tank facilities. The company aims to be nationwide with its own pilot plant for HVO (Colabitoil, 2019). The promotion of licensing partnership gives the means of new business opportunities between Colabitoil organization and other company in Sweden as well foreign companies (Colabitoil, 2019).

Colabitoil is constantly expanding its sustainability work and provides other products and services to reduce the use of fossil fuels in society. The organization promotes and markets fossil free fuel production. Colabitoil continues the strategic work of helping customers to strengthen their brands by providing renewable products. Both freight and passenger transports attract customers with sustainability focus and willingness to pay for sustainability (Colabitoil, 2019). Colabitoil was sponsor and supplier to the first two world championships that have chosen to be the example of setting requirements for suppliers and partners by providing renewable diesel to the Alpina World Cup in Åre 2019 and the Biathlon World Championship in Östersund 2019 to encourage suppliers, partners and volunteers to become fossil-free (Colabitoil, 2019). Colabitoil has also started the environmental permit process for the construction of a production facility in Norrsundet. The possibility of producing renewable Aviation Fuel and Gasoline thus complements Colabitoil's goal of producing HVO that implies more expansion markets for the organization. In this way, the existing infrastructure with rail, harbor and proximity to E4 makes Norrsundet a strategic and natural location (Colabitoil, 2019).

### **5.3. Findings related to Biofuel**

The production of conventional transport biofuels grew just 4% to reach 83 Mtoe (143 billion liters) in 2017, with average production growth of around 2.5%. However, production of conventional biofuels may fall in the European Union after 2020 due to less favorable landscape policy and the increasing efficiency of vehicles (International Energy, 2019). The demand for HVO (hydrotreated vegetable oil) and HEFA (hydro processed esters and fatty acids), is

expected to grow due its potential use for unblended without modifications to engines, maintenance regimes or fuel supply infrastructure (International Energy, 2019).

Waste and residue feedstocks are significant source of HVO and HEFA production, supporting deeper decarbonization from these fuels (International Energy, 2019). The production is expected to grow and generate new facilities and create means for investments to increase the capacity of existing plants. Thus, the production of advanced biofuels from non-food crop feedstocks is limited. Biodiesel and HVO from waste oil and animal fat feedstocks are around 6-8% of all biofuel output. However, production of advanced biofuels from other technologies remains modest in the short term, as progress is needed to improve technology readiness (International Energy, 2019).

EU policy supports advanced biofuels, they updated the Renewable Energy Directive (RED) increasing the quota policies of the member states (International Energy, 2019). The production of advanced biofuels is not growing fast enough to meet the market demand, whereas the increasing production requires sustained average annual production growth of 10% through to 2030. However only 2.5% annual growth is forecast over the next five years (International Energy, 2019). In order to ensure that biofuels projects enter production, climate policy should improve such as advanced biofuels quotas and financial derisking measures. This policy support to ensure their commercial viability until the technology learning and production scale-up reduce costs. Regarding to this, without new policies advanced biofuels will continue cost more than fossil fuels. Currently, most biofuel consumption are in the form of blending with fossil transport fuels (International Energy, 2019).

## **6. Discussion**

This chapter consists of analysis of primary data and secondary data. The empirical findings related to Colabitoil internal and external business environment are compared to theoretical proposition. In this chapter, three major analytical frameworks were considered as our theoretical proposition. Empirical evidence is used to verify the secondary data in the process of analysis of this thesis.

### **6.1. Biofuels industry**

In the case of Colabitoil, the results show that a systematic approach is employed in their production activities. Colabitoil has support from instructions and protocols given by authorities such as MSB (Swedish Civil contingencies Agency) for running the stations. The organization also has owned electricity, wind power and acquired green energy into the process and produces hydrogen gas for their production. For raw material, waste material is the main focus and it affects the price of the product. For example, Colabitoil gets a higher price of their products because of high CO<sub>2</sub> reduction value. For this reason, Colabitoil continues to strive for the best feedstocks. The company fulfills all requirement for renewable sustainable solution for its production and ensure that the feedstock for production are certified as well as it fulfills all renewal energy directives. This implies that governmental regulation on life cycle assessments is applicable in Colabitoil production and the organization measures environmental sustainability in its business practices.

Within the biofuels industry, the results show that production of conventional transport biofuels has increased from 4% to reach 83 Mtoe (143 billion liters) in 2017, with average production growth of 2.5%. This supported advocates such as EU-RED (2009); European Union (2009a, 2009b); Regeringskansliet (2013); Tilman et al., (2009); Diaz-Chavez (2011); Timilsina and Shrestha (2011) arguments on renewable energy consumption regulation. Additionally, this is also in line with Cherubini et al., (2009); Cherubini (2010b); Van der Voet et al., (2010) and Greenea (2017) arguments and the quest to implement life cycle assessments to measure environmental sustainability. These arguments support Colabitoil environmental strategies and notion for the pursuit to achieve renewable energy.

Colabitoil ensures that requirements and compliances on feedstocks evaluation corresponds with the aim of their production capacity and cost efficiency. Colabitoil conducts planning in detail to ensure that all certified feedstock and handling process is controlled by procedures

until the finish product to ensure all requirements are fulfilled to avoid compliances that might threaten the business. With this declaration, there is a strong relation between theoretical arguments on emission reduction regulation and tax declaration on biofuels. This is in line with Regeringskansliet (2013) and EU (2009a and 2009b) arguments on products that are not fossil free.

Colabitoil is more vulnerable to within its business environment due to environmental factors. The results show that waste and residue feedstocks are significant sources of HVO and HEFA production, supporting deeper decarbonization from these fuels. Consequently, Colabitoil is more vulnerable to environmental factors particularly to raw materials. The most vulnerable factor is the classification of the feedstock and the calculation of the CO<sub>2</sub> reduction value because it is diverse in every country. As a result, this influences the price of the end product. In this context, Colabitoil encounters a certain degree of vulnerability on how to buy the certified feedstock, maintain accuracy on renewable energy directives as well as handling the process due to numerous requirements for renewable services and taxes. The governmental indecisions and inconsistency on time perspective in conjunction with larger companies with a lot of financial resources trying to influence the politicians creates instability. Finally, the results also confirmed that the availability of raw materials is a major concern and challenge in the industry. Despite the agreement among all governments in Europe on pursuing to reduce CO<sub>2</sub>, the exact direction is diverse. This is in line with Ahmad et al. (2011) and Toro (2010) arguments on feedstock evaluation in regard to life cycle analysis in production of biodiesel and criteria in quality as well as the cost of feedstock and availability of raw materials.

## **6.2. Colabitoil as SME organization**

In the case of Colabitoil pursuing environmental objectives, the company operates within the scale of SME and as a leading player in the development of HVO diesel, renewable gasoline and aviation fuel in Sweden. The organization employs its environmental objectives through a strong advocate of transition from fossil to fossil free, distributing and selling their products as well as marketing campaigns overall Sweden. The organization also strives with its vision in producing and supplying of fossil free fuel to contribute to a sustainable society. The results also show that Colabitoil practices environmental sustainability and addresses environmental issues both on internal and external levels in different areas of its business environment. The main goal of the company is to be a producer of sustainable fuel to help other companies and people to make an easier choice to transition from fossil fuel to fossil free fuel. This is in line with Hillary (2000)

argument in regard to source of innovation and entrepreneurship and Ghobadian and Gallear (1997) arguments on SMEs control processes and simple planning.

In the case of Colabitoil, the organization works with environmental issues on a daily basis and delivers environmental products to the transport sector, develop renewable products through research and work on sustainability for their customers and owners. In Colabitoil, employees and suppliers are encouraged to only use vehicle with fossil free as source of transportation. The company has been working with environmental issues through their products and services. Results also show that the company produces three different products in the same process from Ethanol, and the products have zero impact on climate as illustrated on Figures 8 & 9. The results indicate that the technique is a proven catalytic reforming of ethanol. The renewable gasoline can replace fossil fuel without modification of engines with retained power. The hydrogen-treated vegetable fats are mainly from waste products. The unsaturated bonds are saturated to produce a stable end product. HVO100 is pure hundred percent renewable fuel and completely compatible with fossil diesel. HVO100 also meets the standards ASTM D 975 and EN15940 with the highest rating and perceives to be most environmentally friendly fuel. This product contains no aromatic or polycyclic hydrocarbons, which significantly improves the environment. This implies that Colabitoil experiments and innovates environment sustainability that influences business operations by adopting sustainable production process and environmental innovation strategies as methods of producing sustainable biodiesel to enhance environmental society. This is line with advocates argument in regard to forces behind organization pursuit for environmental objectives as well as the need of effective management system to achieve environmental sustainability (see Deming, 1993; Rao et al. 2006; Hillary, 2000, 2004; Steger, et al., 2002; Brorson& Larsson, 2006; (Stone and van Berkel, 2004; Seifert, 2005; Viegas, 2005; Zeng et, al.2007) from different perspective in existing literature.

Colabitoil has been in the biofuels industry for over five years and with no background old history and the succession of the organization is on strategic direction, belief, values, and educational background of the owner. This is in line with Hillary (2000); ACCA (2012) and Mandl and Dorr (2007) argument in regard to small organization owners and their background as well as values and beliefs. This is also in line with results, Colabitoil business establishment of fossil free fuel and aim to have local production, feedstock to local consumption in nearest future. Thus, the company production capacity is not enough and it takes a lot of financial resources, for this reason the organization decided to offer other companies technical license to

produce with their own technology. This implies the Colabitoil applies its technical knowhow, resource, time and capital to strengthen and integrate its business strategy and extends technical solutions to other countries to enhance its vision and goals for environmental sustainability through licensing agreements despite the limitations of resources and production. This is not in line with James et al. (1998) argument that states SMEs lack resources, technical ability, time and capital which result in inactivity. This argument is not exactly the case for Colabitoil.

With regards to strategies that address environmental issues, Colabitoil employs and practices environmental initiatives in various dimensions of their business activities. Respondents stated that HVO leads the transition to a fossil-free environment and in order to address environmental issues in all areas of business, the organization has implemented a local management system based on internal concerns and legislation requirements to adapt environmental sustainability. This is in line with Roger (2004) argument in regard to small firms' advantages and flexibility that enable the means to faster decision making for creating innovations. This is also in line with Colabitoil business objectives and activities. In support of this notion, Colabitoil acquired a sustainability certificate from the Swedish Energy Agency (SEA) regarding their trade and raw materials. All business activities of the company are based and driven by a sustainable strategy and sustainable society starting from the production to the process and end products. Most importantly, environmental sustainability in what kind of feedstock is used, how it is handled and processed because it is vital for the company that everything has to be environmentally sustainable with the economy because if not 100 percent sustainable it is not profitable for the organization. Within this elaboration, there is a strong relation to Roger (2004) argument.

As part of Colabitoil strategy, environmental issues are of most importance in decision-making, establishing on continental Europe, the Environmental Impact Assessment (EIA) and feasibility considerations are obligatory. For example, Colabitoil specifies the CO<sub>2</sub> reduction value of their sold products and provides figures on how much carbon dioxide their customers have reduced with their travel. This is not in line with Burke and Gaughran (2006) argument that states SMEs lack of knowledge on relevant environmental legislation and are unaware of their negative impact on the environment. This argument contradicts Colabitoil environmental objectives and practices. In particular, the organization has knowledge on relevant environmental legislation.

Colabitoil contributes and enhances major transition to a sustainable society with its own production plant, facilities and service stations through sales. The demand from the market is considerably greater than the supply. In this case, Colabitoil created sustainable innovation

solutions for consumers. The highest CO<sub>2</sub> reduction value, the higher is the price and same interest for sustainability and profitability. For this reason, Colabitoil is putting a lot effort on investment in research and development to find the next generation of feedstock. On the other hand, result also indicate that managers opinions on corporate environmental objectives are diverse due to lack of effective communication. For example, majority of the respondents stated that there is no such document. However, there are protocols and routines as well as an agenda to revise and all documentation reports are related to corporate objectives and the parts of decision-making is related to objectives. This is not in line with Rao et al. (2006), states that SMEs only respond to environmental concerns that is line with regulatory authorities. The results indicate that Colabitoil responds to environmental concerns not by compliances but rather actively as their business strategy as well as main vision and goals.

Environmental management system gives the means to reduce environmental impact. There is a strong theoretical relation and recognition among advocates on why organization should implement Environmental Management Systems (see, Brorson& Larsson, 2006; Honkasalo, 2000; Steger, et al., 2002; Wenk, 2004; Starkey, 1998).

### **6.3. Environmental management system (EMS)**

Colabitoil business practices is also influenced by its internal and external environment. The results indicate that the leaders and management of the organization recognize the need of environmental management system. There are no environmental management tools, but the board management are currently reviewing the decision. However, a systematic approach is employed with the support of instructions and protocols given by authorities such as MSB (Swedish Civil contingencies Agency) for running the fuel stations. For example, the logistic department security advisor that supports with training and permits as stated in the earlier section.

The results show that Colabitoil is sponsor and supplier to the first two world championships that has chosen to be the example of setting requirements for suppliers and partners by providing renewable diesel to the Alpina World Cup in Åre 2019 and the Biathlon World Championship in Östersund 2019 to encourage suppliers, partners and volunteers to become fossil-free. Colabitoil has also started the environmental permit process for the construction of a production facility in Norrsundet. The possibility of producing renewable Aviation Fuel and Gasoline thus complements Colabitoil's goal of producing HVO that implies more expansion



markets for the organization. In this way, the existing infrastructure with rail, harbor and proximity to E4 makes Norrsundet a strategic and natural location. Colabitoil practices and environmental strategies towards sustainability clarified Biondi et al. (2000) and Sayre (1996) arguments on goals for an organization environmental activities and efforts to implement EMS. Additionally, this is also in line with Biondi et al. (2000) arguments on organization major motives are to enhance strong competitive advantage and meet compliance requirements. However, Colabitoil tends to acquire information that will enable the means to process a decision to implement a management system for their activities. This is line with Ortiz et al., (2013) argument in regard to how SMEs lack knowledge and competencies to implement EMS.

Colabitoil achieves environmental sustainability through offering goods and services with a comprehensive portfolio of products that enables our customers to lower their carbon footprint by combining high quality and knowledge of knowhow in their product solution processes. Colabitoil employs environmental policies, routines and protocols on how things should be done in all areas of their business and operational activities. Employees are expected to practice and live up to how the organization advices their customers and suppliers on daily basis in all areas of their business activities. This is line with Psomas et al. (2011) argument in regard to companies employing environmentally friendly policy and commitment to improve their environmental performance. Additionally, this is also in line with Aragon-Correa et al. (2008) arguments in regard to SMEs enhance financial performance through proactive environmental practices. This is related to Colabitoil action and commitment to improve their environmental performance.

Colabitoil has been in the biofuels industry over five years with no old history and leads the development of renewable diesel with owned pilot plant for the production of HVO100. Rao et al., (2006) articulated on SMEs to ensure the implementation of EMS. Feldman (2012) proposed that ISO 14001 *requires* internal and external procedures that give the means for analysis through *auditing, performance evaluation, labeling, life cycle assessment, and product standards*". Wells and Galbraith (1999), claimed that the adoption of ISO 14001 certification for SME ensures continuous improvement and increase competitive advantage. Umweltbundesamt (2000) argument is also in relation to EMS recognition and performances. Colabitoil has a system on how to handle their practices. Moreover, government evaluates the system and process for environmental qualification and issue a sustainability certificate on how to work internally. However, there is diverse opinion on personnel in charge of environmental

issue in the organization. Result indicates that there is a need to assign or hire an officer with a strong environmental background and experiences. Respondents stated that the overall responsibility lies with the CEO of the company with regards to various departments' petrol stations and logistics/transport. Moreover, responsibility also lies with each department manager. Consequently, Colabitoil is still in the process of decision making to consider an EMS implementation for their business management but the organization employs environmental initiatives.

Colabitoil aims to find local feedstock and input that could give the means to create feedstock from such biomass. Moreover, the main driving force concerning environmental work is the credibility for their renewable fuel products as well as being producers. Furthermore, Colabitoil evaluates environmental issues and impacts of their products and services through ongoing re-evaluation related to personal knowledge. Thus, evaluation of their products is conducted by third party, partnership and authority. In addition, Colabitoil also conducts evaluation on their customer and issues certificate on the reduction of emissions. This is line with Biondi et al. (2000) and Umweltbundesamt (2000) arguments on organization motives.

Stroufe (2000) argued that EMS requires integration of management processes. The primarily objective for documentation is to enable the means to focus on pollution control and waste minimization. Stone and van Berkel (2004); Seifert (2005) and Viegas, (2005) affirmed that the Plan-Do-Check-Act (PDCA). With this adoption, organizations will be able to conduct their planning, controlling and reporting environmental performance to internal and external stakeholders. This is in line with Ilntich et al. (1998) and Stapleton et al. (2001) arguments that claimed EMS is administrative tool and encompasses the requirements of an organization and enable the means to control the effect of its activities as well as products and services. The results show that Colabitoil is the process of decision and planning for the implementation of management system. The organization has policies and goals in order to fulfill environmental requirements but planning to structure a documentation system where they could control the effect of company activities. Moreover, the company lack of an environmental annual report.

According to the Deming's cycle, the planning stage enables the means of conducting an environmental evaluation on how the organization activities influences the environment. On the other hand, Hillary (2004) argued for the benefits of implementing EMS in SMEs that reflects on the internal and external functions of an organization. In the case of environmental evaluation of Colabitoil internal business environment, the organization has an environmental

policy, routines and protocols on how things should be done correctly in all areas of their operations, moreover, their goals and objectives are focused on environmental issues. For example, the main goal of the company is to be producer of sustainable fuel. Regarding to the structure of the organization and their resources, the organization has implemented a local management system based on internal concerns and legislation requirements to adapt environmental sustainability. All distributions are with renewal fuels, the organization help customers and car companies to change from fossil to renewable fossil free. Promotion of products and services are carried out on monthly basis to bring awareness of their product which significantly improves the consumer environment behavior. Internally, meetings are conducted once a week for employees' reflection, feedback and inputs.

On the other hand, Colabitoil external business environment is being influenced by compliance, stakeholders and production. In relation to customer, the company helps companies and people to make easier choice to translation from fossil fuel to fossil free fuel, for example they provide environmentally friendly alternative fuel to public buses. The organization also considers the environmental impact of their supplier. In addition, Colabitoil needs to know the traceability of the feedstocks.

From an organization perspective, compliance is applied to fulfill the rules and regulations standards for acceptable pollution levels. With this regard, it is vital to understand the purpose and functions of the Environmental management system. In relation to compliance, Colabitoil supplies information to the Swedish Energy Agency and the County Administrative Board. Colabitoil also supplies information and reports such as statistics, reports on what kind of volume are highly recommended to submit. Colabitoil has an environmental permit that is demanded to live at the top, which shows what and how much capacity can be handle in the production. The company is subjected to many different environmental requirements from various authorities ranging from what applies to their production, tank facilities and transport. For example, the logistics, production and gas stations requirements and regulation are very strict. In addition, the government classified their renewal product like a normal diesel, so the requirements are higher.

In relation to Colabitoil products, results show that the organization evaluates environmental issues and their impacts of their products and services through ongoing re-evaluation related to personal knowledge. Colabitoil provides environmental information as well as data sheets for

their products. For example, safety data and product sheets are provided quarterly in arrears to issue the CO<sub>2</sub> reduction value of the products delivered to customers. Thus, evaluation of their products is conducted by third party, partnership and authority. Colabitoil also conducts evaluation on their customer and issue certificate on the reduction of emissions. However, the environmental policy but has not been revised and when it comes to Colabitoil specific actions to prevent pollution, respondents indicate that the organization has protocols and routines due to environmental approval. The organization different preparedness's for where the chain the pollution can occur. For logistics, they have an action plan for emissions at hose breaks and in production for oil separators. All filling stations includes safety systems such as measurement and alarm system if the volume drops for some reason without any customer activities and same about water in the fuel.

In relation to production, Colabitoil aims to find local feedstock and input that could give the means to create feedstock from such biomass. However, the findings show the lack of a responsible for environmental issues in the company. Regarding to their production, Colabitoil fulfills all requirement for renewable sustainable solution for its production and they ensure that the feedstock for production are certified as well as it fulfills all renewal energy directives, furthermore their pilot plant works with renewal energy, wind power, and the product has zero impact on climate. Colabitoil controls all process since the feedstock is bought until the finish product to ensure all requirement are fulfilled.

In relation to suppliers, the results show that Colabitoil exchanges of knowledge and transparent communication between key board members, employees and customers as well suppliers regarding Colabitoil future production development and goals. Colabitoil is listed in the stock exchange market. Moreover, the organization reflects on the importance of building close relationship with an open dialogue on future plant projects with its stakeholders.

Finally, the organization aims for continuous improvement to enhance sustainable development and performances in all areas of its business practices. All distributions are with renewal fuels, the organization helps customers and car companies to change from fossil to renewable fossil free. Results show that Colabitoil is in the process of political dialog with municipalities and regions for the lifting the importance of sustainable fuels and provide environmentally friendly alternative fuel to public buses. The illustration of environmental management system based on Deming's cycle is recommended for continuous improvement.

The DO stage requires the mean to communicate the organization objectives and goals to its employees. It allows that organization to focus on effective management control and planning and provide resource to educate and training the employees. Thus, implement and integrate the management system into all levels of the organization.

In the case of Colabitoil, the internal objectives are mixed with the external expectations and requirements. As result, the effective management control and planning needs to be restructured to separate internal objectives from external. The results show that the organization has expanded due to rapid growth but there is a need to hire more employees and delegate responsibilities. There is also a need for decision making to implement a management system that serves both internal and external objectives.

The Check stage enable organization to monitor the progress towards achieving the targets in order to evaluate and ensure that the organization main objective and goals are met as well as ensuring and confirming that internal audits are correctly manage. Consequently, Colabitoil is still in a process of decision of planning and the management are considering a management system that could be suitable for the entire business operations. However, Colabitoil has a system authorized and regulated by authorities on how to work internally.

The Act stages enable the mean to ensure that communication and documentation are managed correctly as well as analyzing management review to highlight areas that are needed for further attention. In the case of Colabitoil, the management review reflects on the need for change management and to become more environmentally friendly depends.

The organization considers the environmental impact of their customers and suppliers. Results show that the company is already an environmental company and run all transports on renewable fuels which enable the organization to procure other services through requirements against suppliers. The next step is production and material resources, mode of production, transportation. Moreover, results also show that the company is planning to expand its own production and supply more products as well as acquiring more companies. Mostly importantly, developing the part of the company and working with research and development for production to be able to go to the next step and generate more new technology concepts.

## 6.4. Change management

Colabitoil has expanded with a huge increase from two to fifty-five employees in the last five years. As a result of continuous expansion, there is a need to fill certain parts of the organizations with personnel responsibilities as well as to get employees more involved in the process is considered by the management. Lozano (2012b) argued that it is important to consider the system of the company and its stakeholders. Gray (2002) claimed that managers are usually involved in all processes of change. This is in line with Colabitoil current planning process. However, Lozano (2012b) argued that companies ineffective planning for their organizational changes, but planning enable means to reduce the efforts for improving their sustainability. Consequently, managing change in a small company requires specific management skills (Winch & McDonald, 1999). This implies that the attempt to implement change and integrate new system into an organizational practice might requires a high degree of commitment and leadership skills in order to manage any changes within and outside the business operation.

The findings also show that managers affirm that there is a huge need to communicate their goals and vision to their customers in a better way as well as to target and implement a strong image in the organization. The management is also looking for a new general business system that can manage all data in the system such as internal and external information and documentation.

Lozano (2012b) integrated the model for Corporate Sustainability by Anderson and Ackerman Anderson's (2001) on effective approach to address change in an organization. The authors explained further that corporate sustainable drivers are suitable to change from a Statue Quo (SQ) to a more sustainable oriented state (MSOS) towards producing more sustainable products and services. However, there are some barriers that could occur, therefore it is vital to identify potential resistance and apply appropriate strategies to overcome these barrier (Lozano, 2012b). In the case of Colabitoil, the company is constantly expanding its sustainability work and provides other products and services to reduce the use of fossil fuels in society. The organization promotes and markets fossil free fuel production. Colabitoil continues the strategic work of helping customers to strengthen their brands by providing renewable products. Both freight and passenger transports attract customers with sustainability focus and willingness to pay for sustainability. Colabitoil is one step ahead in planning when it comes to their business activities and working with customers to identify the need to address barriers or other factors

that might threatened their operational activities. This is in line with Lozano (2012b) argument regarding effective approach to address change to be more sustainable oriented towards producing more sustainable products and services.

Wenk (2005) and Robert et al (2007) articulated on the diverse perception regarding EMS sustainability planning and principles. On the other hand, MacDonald (2003) claimed that EMS requires significant changes in existing organization planning. In the case of Colabitoil, the results show that the organization is considering to hire an environmental coordinator mainly for the environmental permit to build a large production in Norrsundet but it can also be implementation of an industrial system such as certifications because the organization needs to fulfill a lot of requirements. Colabitoil also considers the environmental impact of their supplier and place demand to fulfill the minimum requirement to acquire tax free. Finally, the organization needs to improve their production capacity and cost efficiency. Hence, there are lot of raw materials and broad possible feedstocks, but it is vital to know what is the best and what market and technology is needed to enable flexibility in decision making.

The company has increased their geographical presence through international partnership and new establishments increase in sales as well as existing tank facilities. The company aims to be nationwide with its own pilot plant for HVO the promotion of licensing partnership gives the means of new business opportunities between Colabitoil organization and other company in Sweden as well foreign companies. Colabitoil is building the foundation and conducting different kind of investigation on what is the best way to go for acquiring best feedstock, examining what the market wants to be more effectively and flexible in production of future products despite the uncertainty on future tax reduction due to instability in government decisions. Within this elaboration, the implementation of EMS could enable Colabitoil to employ changes in their planning activities in a more effective and suitable states.

## **6.5. Summary of the chapter**

The three frameworks models used in this study were developed to critically assess Colabitoil entire business environment both from the internal and external perspectives.

The main objective of this thesis was to analyze the implementation of environmental management systems (EMS) in a small company. In process, analysis of Colabitoil and its business environment types of model were used in regard to EMS process of implementation three. In particular, Deming cycle (1993) PDCA for implementation and continuous

improvement. This model was employed to increase future knowledge and understanding on how organizations can pursue environmental sustainability towards future changes in its business environment. The first stage of Deming cycle (1993) on planning addresses the internal business environment of Colabitoil and has provided a good understanding of specific factors that needs to be reconsidered in decision making.

The second stage of Deming cycle (1993) on DO addresses the significant importance and limitations in providing an in-depth analysis of external factors that focuses on external influences such as production and compliance obligations, products and services, customers, supplier and other stakeholders. For this reason, change management was applied for Colabitoil internal and external business environment analysis to provides an in-depth view and understanding of uncontrollable factors that might have an impact on the industry and the organization can integrated into strategic principles on both internal and external level of its business operations and future planning for continuous improvement.



## **7. Conclusions**

The authors managed to fulfil the aim and main objective of this thesis and answer the two research questions developed in this thesis. In regard to this reference, the following conclusion remarks is drawn.

### **7.1. RQ 1: Does EMS affect Colabitoil environmental sustainability?**

Yes, Colabitoil is highly environmental and innovative driven in regard to the way of conducting business as well as their strategic approach on environmental sustainability. With the implementation of EMS, Colabitoil will be able to manage its internal and external business operations effectively as well as systematically manage all compliances needed.

The company is focused on customers translation from fossil fuel to fossil free fuel consumptions. Most importantly, the company is thriving for continuous growth and expansion in all areas of their business practices. For example, Colabitoil is expanding its sustainability work and provides other products and services to reduce the use of fossil fuels in society. In order to maintain and improve its competitive, there is strong need to Colabitoil to focus on being an environmentally sustainable company through their production as well as all areas of their businesses.

The organization operational activities require that they need to fulfill all environmental requirements to have the business running and enable the means of tax reduction benefit for their product. Based on this argument, EMS could improve their brand image and control their environmental activities, such as handling and documenting the feedstocks, production processes and product evaluation documentations, internal and external policies as well as all regulatory requirement for the entire business operation.

The main driving force of Colabitoil environmental sustainability is their credibility as a producer of sustainable products and their attribution to sustainable society which is of great importance to the public image of the company. With continuous improvement on Plan, Do, Check and Act, the organization can promote and market fossil free products and fuel production as well as integrating sustainable strategies into their organization goals and environmental objectives. Improve and attract customers with sustainability focus and willingness to pay for sustainability through re-evaluation of the organizational goals and vision.

## **7.2. RQ 2: How could Colabitoil plan changes to implement EMS?**

EMS involves the integration of management processes for planning, controlling and reporting environmental performance to internal and external stakeholders. According to Deming's cycle, the planning stage enables the means of conducting an environmental evaluation on how the organization activities influences the environment. Colabitoil has an environmental policy, routines and protocols on how things should be done correctly in all areas of their operations, moreover, their goals and objectives are focused on environmental issues. For example, the main goal of the company is to be producer of sustainable fuel.

The analysis indicates that Colabitoil internal objectives are mixed with the external expectations and requirements. As result, the effective management control and planning needs to be restructured to separate internal objectives from external. The results indicate that the organization has expanded due to rapid growth but there is a need to hire more employees and delegate responsibilities. There is also a need for decision making to implement a management system that serves both internal and external objectives.

The organization also planning to hire an environmental coordinator mainly for the environmental permit to build a large production in Norrsundet. Despite that fact that the organization employed an experimental process and method to generate biofuels that is both sustainable for the organization brand image as well for the society enhancing environmental sustainability, there is a need to re-evaluate both the internal organization and external business environment. For example, in order to achieve this goal, the organization needs to plan and consider the implementation of management system such as certifications because the organization need to fulfill a lot of requirements. Managers affirm that there is a huge need to communicate their goals and vision to their customers in a better way as well as to target and implement a strong image in the organization.

Consequently, Colabitoil external business environment is been influenced by compliance, stakeholders and production. For this reason, the DO planning stage requires the mean to communicate the organization objectives and goals to its employees. It allows Colabitoil to focus on effective management control, planning and provide resource to educate and training the employees. Thus, Colabitoil needs to implement and integrate the management system into all levels of the organization.

### **7.3. Limitations of this thesis**

The results of this case study may not be found in other organizations or generalized. Therefore, the conclusions and the suggestions drawn in this thesis are addressed to only the case company and will have limited suitability to other companies. The provided recommendations are the hypotheses that are mainly based on the results of the finding from the interviews and documentation of internal sources. There are also several evidence-based from existing research in support of this outcome. Colabitoil main intention is to lead the development of renewable fuels with the aim of replacing fossil fuels to fossil free fuel to achieve environmental sustainability.

### **7.4. Managerial Implications**

The answered research questions and suggestions in the following chapter can have managerial implications, as they address the real life case within an existing organization of its own size and nature of business. The authors of this thesis propose that the recommendations provided in this thesis could assist the case company in the process of decision making and choice of environmental system through re-evaluation of the organization objectives and external requirements needed to acquire higher business sustainability. Moreover, there are few academic researches on EMS implementation in regard to small and medium enterprise operation in the biofuels industry from this perspective this thesis fills in a gap in research proportion and is one of its kinds.

### **7.5. Recommendations**

In order to propose the implement environmental management system in Colabitoil organization, it is vital to understand the case company internal and external business environment. The organization also needs to understand the driving forces behind the current and future environmental demands that might occur if implements new management system to increase future knowledge and understanding on how organizations pursue environmental sustainability towards future changes in its business environment.

This study result aims the contribution to existing research on EMS in small companies as well as assisting the case company to be more insisting towards its own environmental performance and business development. Within this elaboration and the outcome results of this study, the authors of this thesis recommend a re-evaluation of all documentation and effective

management control and planning to enable the means restructured objectives inline within primary goals of the organization and separate internal goals from the external.

The main driving force of Colabitoil environmental sustainability is their credibility as a producer of sustainable products and their attribution to sustainable society which is of great importance to the public image of the company. With the Plan, Do, Check and Act, the organization can enhance a strong competitive advantage by integrating sustainable strategies into their organization goals and environmental objectives through continuous improvement in all aspect of the organization business environment. The organization employs its environmental objectives through strong advocate of translation from fossil to fossil free and practices environmental sustainability both on internal and external level in different areas of its business environment.

Finally, the three models used in this study were developed to critically assess the entire business environment of Colabitoil. The objective of this thesis to analyze the implementation of environmental management systems (EMS) in a small company and in the process analysis of Colabitoil in relation to its business environment was conducted.

The cause of unfavourable environment generated the needs to address environmental concerns and different perceptions about the implementation of EMS in organization, particular within the SMEs sector. it is argued that the implementation of EMS in organization enable the means to focus on pollution control and waste minimization through the Plan-Do-Check-Act (PDCA) approach.

After the analysis of Colabitoil business environment, we recommend that EMS could be a suitable system to visualize the entire environmental business that Colabitoil needs to invest its resources to improve the level of environmental performance in their activities. For example, EMS enables the integration of management processes for planning, controlling and reporting environmental performance to internal and external stakeholders.

With the planning stage, Colabitoil can have the means of conducting an environmental evaluation and analyze how the organization activities influences the environment. Colabitoil has policies and goals in order to fulfill environmental requirements but planning to structure a documentation system where they could control the effect of company activities. The implementation of EMS could serve as an administrative tool and encompasses all requirement

of Colabitoil such as policies, goals, documentation systems, annual reports and regulatory requirements, control the effect of its activities as well as products and services.

The Do stage requires the mean to communicate the organization objectives and goals to its employees. It allows Colabitoil to focus on effective management control, planning and provide resource to educate and training the employees. This will help to easy measure environmental performances as well as all future sustainable objectives in their activities. Thus, Colabitoil needs to implement and integrate the management system into all levels of the organization.

### **7.5.1. Change management**

Colabitoil has expanded due to rapid growth and there is a need to hire more employees as well as delegate responsibilities. There is also a need for decision making to implement a management system that serves both internal and external objectives. In order to develop an effective management control and planning, it is vital to restructured and separate internal objectives from external. The Check stage enable organization to monitor the progress towards achieving the targets in order to evaluate and ensure that the organization main objective and goals are met as well as ensuring and confirming that internal audits are correctly manage. With this execution, it will be much easier to follow up update and protocols on Colabitoil internal objectives and the expectations of external requirements.

Colabitoil, the management review reflects on the need for change management and to become more environmentally friendly depends. With the Act stages Colabitoil can ensure that communications and documentations are managed correctly. Colabitoil management will be able to conduct a management review to highlight areas that are needed for further attention.

### **7.5.2. EMS advantages for Colabitoil**

The benefits of implementing EMS is determined by internal and external functions.

With the implementation of EMS, Colabitoil could re-evaluate the internal organization, financial improvements and employees benefits. The organization will be able to evaluate their external environmental communication and commercial activities that are relatively response to improve environmental performance, brand image of the company and relationships with stakeholders.

### **7.5.3. Theoretical contribution and gap for further research**

Within the biofuels industry, the results show that the most vulnerable factor is the classification of the feedstock and the calculation of the CO<sub>2</sub> reduction value because is diverse in every country. Waste and residue feedstocks are significant source of HVO and HEFA production, supporting deeper decarbonization from these fuels. Ahmad et, al. (2011) argued that feedstock evaluation reflects on the criteria in quality in regard to life cycle analysis. On the other hand, Toro (2010) argued that production of biodiesel reflects on the cost of feedstocks and availability raw materials. Additionally, Cherubini et al., 2009; Cherubini, 2010; and van der Voet et al., 2010 argued that life cycle assessment enabled the means to measure environmental sustainability.

Production of conventional biofuels could decrease and the increasing efficiency of vehicles within the European Union after 2020. The Swedish authorities demanded Hydrotreated Vegetable Oil (HVO) that has to consists at least of 98 % of biomass in order to have taxes free (European Union, 2009b). With this elaboration, discussion, there is a strong relation between theoretical argument on environmental sustainability and cost-effective way of improving energy efficiency and reduce conventional pollution of emissions in the society.

SMEs are source of innovation and entrepreneurship. On the other hand, there is gap in regard to research concerning biofuels organizations with no old backgrounds running business within sustainable biofuels solutions. James et al. (1998) argued that SMEs lack resources, technical ability, time and capital which result to inactive. This is argument is not exactly the case Colabitoil. The results show that Colabitoil applies it technical knowhow, resource, time and capital to strengthen integrate its business strategy and extends technical solution to other countries to enhance its vision and goals for environmental sustainability through licensing agreements despite the limitations of resources and production.

Rao et al. (2006), stated that SMEs only respond to environmental concerns that is line with regulatory authorities. This is not in line with Colabitoil environment objectives and activities. Colabitoil contributes and enhance major transition to a sustainable society with its own production plant, facilities and service stations through sales. The demand from the market is considerably greater than the supply. The results show that Colabitoil created sustainable innovation solutions for consumers. The highest CO<sub>2</sub> reduction value, the higher is the price

and same interest for sustainability and profitability. For this reason, Colabitoil is putting a lot effort o on investment in research and development to find the next generation of feedstock.

Within this elaboration and conclusion, there is also a gap in research on SMEs industries operating and contributing to environmental sustainability based on visions and goals of the company not by compliances. We recommend that the need further research on innovation and sustainable organization with no old history and backgrounds who are running fossil free solutions within biofuels industry.

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## **Appendix: Interview guide questions for Colabitoil**

1. What is your role in the organization?
2. How long have you been working in the organization?
3. In your role in Colabitoil, do you deal directly with environmental issues?
4. Could you please tell us how Colabitoil has been working with environmental issues?
5. Which of the environmental factors is Colabitoil more vulnerable to?
6. Do you have any person specifically in charge of environmental issues in the company?
7. Do you know if Colabitoil has any strategies that address environmental issues? If yes, could you please explain how you have been implementing them?
8. What has been the main driving force concerning the environmental work?
9. Do you use any environmental tools in Colabitoil?
10. Do you have an environmental policy? If yes, how often do you revise it?
11. Do you consider the environmental impact of your suppliers?
12. Do you document any corporate environmental objectives?
13. How do you evaluate the environmental issues and their impacts of your products and services?
14. Do you know if Colabitoil has specific actions to prevent pollution? If yes, Which ones?
15. Do you provide environmental information or data sheets for your products?
16. Do you submit any environmental report on a regular basis to any official authority?
17. Which environmental regulations may applicable to Colabitoil?
18. What could be the next step for your company to become more environmentally friendly?
19. What kind of change to consider for the organization in the nearest future?