MASTER THESIS

Corporate Sustainability Framework for an International Engineering Service-Based Company: A Case Study at MECAL BV

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Management Summary

In recent years more and more companies are modifying their business activities to cope with the challenge of finding a proper balance between economic, environmental and social performance. Many studies in the realm of sustainability and sustainable development have found that sustainability programs within companies are pervasive and have become a major element in determining their business strategies. Therefore, the concept of sustainability has met a growing interest by companies trying to address societal demands while still delivering profits to their shareholders. Corporate Sustainability (CS) is introduced the company's strategy to conduct a perpetual and responsible business by aligning the company's objectives with three performance criteria of financial, social and environmental. However, there is no general solution to implementing CS. This means that CS is to be understood as a custom-made process, in which the company must adjust the strategies according to the company's objectives and capabilities.

Up until now, most available academic literature relating to sustainability frameworks emphasizes the importance of this concept for manufacturing-based companies (e.g. the use of renewable materials, reduction of hazardous wastes, minimizing pollution rates, etc.). Meanwhile, how to implement a sustainability framework in service-based companies is somehow still overlooked. Therefore, to provide a deeper understanding towards the applicability of a sustainability concept in service-based companies, an applied research is performed at MECAL BV. MECAL BV is an international engineering service company located in Enschede, the Netherlands. It operates an international business in three different industries (i.e. wind energy, semiconductor and optical) and in three geographical markets (i.e. Europe, United States and Asia).

This research in MECAL BV is carried out for both scientific and managerial purposes. With respect to the scientific purpose, this research tries to explore the applicability of a CS framework in an attempt to prevail the limitation to companies operating in manufacturing goods. The research is directed to formulate a framework that can be utilized to develop feasible, suitable and acceptable CS programs for a service-based company. With respect to the managerial purpose, this research is conducted to provide a better understanding for the managerial practices of CS formulation, especially in the area of international engineering service companies. For this purpose, this research develops suitable CS programs for MECAL BV as part of its customers' demand as well as to foster its competitiveness.

To achieve the mentioned objectives, this research is conducted in a deductive manner in which existing theories related to a CS framework are applied to test their suitability for an engineering service company (i.e. MECAL BV). Along the process, several modifications and changes are made accordingly to adjust the framework to make it applicable to this company. A comprehensive data collection is performed through interviews, questionnaires and documentation analysis to identify the company's internal and external aspects from a sustainability viewpoint. This process is performed to determine whether the company has sufficient resources and potential opportunities to conduct CS programs. After it is determined that the company is feasible for sustainable development, the research is continued by formulating the planning, execution and monitoring activities.

There are two main results that are produced by this research. The first result is a framework to develop a feasible, suitable and acceptable CS programs for an engineering service company such as

MECAL BV. The second result is the recommendations for sustainable development of MECAL BV, including the competitive sources of the company that are benefited from the CS programs' implementation.

This research introduces a suitable CS framework for an engineering service-based company that consists of the following four main activities:

1. Sustainability Assessment,
2. Planning,
3. Executions and
4. Monitoring and Reporting

The detailed description of each process is as follows. The sustainability assessment is first performed to assess the company's feasibility regarding its resources, capabilities and opportunities in pursuing sustainable development. This is accomplished by processing the company's internal resources as well as its external opportunities including the services provided by the company using a SWOT analysis, a service blueprint and custom-made matrixes that are developed to process the company's data based on its triple performance (financial, social and environmental). This sustainability assessment also includes the assessment of the company's *sustainability drivers, sustainability forces* and *sustainability constraints* that are useful to generate suitable CS programs for the company.

The results obtained from the sustainable assessment are then translated into *sustainability principles* in the planning phase. The sustainability principles are the company's sustainability goals and mission statement, sustainability action guidelines and policies that will be the standard when the program will be implemented.

The execution of sustainable development starts by setting up programs that are suitable with the company's sustainability principles. In addition, suitable *sustainability strategies* including the structure and the system that are required to successfully implement the program are also formulated in this phase. This phase produces CS programs that are supported with implementation strategies that consist of the schedule and parties related with the CS programs, as well as the *sustainability performance monitoring system*.

Since the implementation of the CS programs is an ongoing process, formulating specific monitoring and reporting procedures is crucial to support the implementation of the CS programs. Monitoring activities are needed to ensure that the implementation of CS is aligned with the planning. Meanwhile, public reporting will facilitate easier feedback from the stakeholders and transparent business.

By utilizing the designed CS framework, competitive sources for the company are also discovered. This research discovers that the company can gain competitive advantages through improving the less-efficient business operations, adopting the sustainability strategies of business partners and promoting the sustainable development of the company.

In addition, there are two main contributions to academic literature delivered by this research. The first contribution is that this research introduces a complementary step that is crucial for the implementation of a corporate sustainability program in a service-based company. The

complementary but yet crucial step is a sustainability assessment process. The main goal of a sustainability assessment is to ensure whether the company has sufficient resources and capabilities as well as potential opportunities to conduct sustainable development. The findings in this research show that such a comprehensive assessment, which includes the consideration of all aspects of the company, provides a better insight into the feasibility of a corporate sustainability program. This finding emphasizes that a sustainability assessment cannot be performed satisfactorily by considering only the company's internal resources, but should also take into account external factors (e.g. sustainability trends, sustainability programs of business partners and customers, etc.) and the appropriateness of environmental conditions (e.g. government regulations, societal demands, etc.).

The second contribution that is delivered by this research emphasizes a *service blueprint analysis.* The utilization of a service blueprint can support the theory proposed by other scholars regarding the argument that engineers need clear guidelines to implement sustainable development in their daily activities. The analysis of the service blueprints discovers that one major process that is feasible to be integrated by the sustainability principles is the process of engineers working on projects. This leads to the development of supporting policies needed to achieve the sustainability goals of the company. Furthermore, a service blueprint is also useful to discover the processes in which competitive advantage can be achieved.

As for managerial practices in MECAL BV, the research concludes that a CS initiative for MECAL BV is feasible. The research findings confirm that MECAL BV has sufficient resources and capabilities to perform sustainable development. In responding to the opportunities to sustain the relationships with the customers and to sustain the businesses in the company, MECAL BV has sufficient resources and capabilities. MECAL BV has sufficient resources to conduct sustainable development as the company is equipped with more than 50 engineers with broad engineering knowledge, has been operating in the renewable energy industry, has 20 years of experiences in harmless business of providing engineering consultancy services and has close relationships with major key players in worldwide markets. In addition, as MECAL BV provides consultancies for its customers, the company is perceived to have the capability to sustain the company as well as the customers' businesses by persuading the customers towards sustainability actions and to integrate sustainability principles into the works that are delivered to the customers. MECAL BV also has the capability to survive and promptly improve its performances towards the macro financial situation of the world's economic crisis in recent years.

MECAL BV's sustainability goals and mission statement are formulated based on the results obtained from assessing MECAL BV's sustainability drivers. As such, MECAL BV needs to establish its sustainability goals as:

1. Sustainable relationships
2. Environmental protection
3. Viable business

Based on these goals, the mission statement for MECAL BV is formulated as follows:

"*It is our mission to achieve a sustainable living for the small planet that we live in by conducting responsible engineering practices. We sustain relationships with partners that also embrace ethical business practices, we endeavor to help protect the earth by implementing responsible production*

processes and wise material selection and we foster our economic performance through a greener corporate culture."

In addition, relevant sustainability action guidelines and supporting policies are formulated as these will facilitate engineers to easily integrate sustainability principles into their daily activities and support the achievement of the company's sustainability goals. Based on the analyses from this research, the three most suitable policies that can be adopted by MECAL BV are:

1. Production Policy
2. Procurement / Supplier Selection Policy
3. Business Codes of Conduct

After all elements of the sustainability principles of MECAL BV are determined in the planning step, execution of the sustainable development at MECAL BV begins by determining specific programs that MECAL BV has to pursue in order to achieve its sustainability goals. CS programs for MECAL BV are:

1. The Orientation of MECAL BV's Corporate Sustainability to all levels of the company.
2. The Practice of In-Office Green Corporate Culture.
3. The Integration of sustainability principles into MECAL BV's quality management system and human resources management:

The execution step continued by setting up the schedule of CS implementation and determining the people responsible, including the Quality and Sustainability Management team and the shareholders, to ensure the success of CS implementation at MECAL BV. This research suggests that Mr. Richard Jungman, Managing Director of MECAL BV, is the leader that needs to be responsible for the implementation of the CS programs at the company.

After the sustainable development is executed, MECAL BV needs to design suitable system and procedures to monitor and report its sustainability activities. This research suggests MECAL BV needs to determine the sustainability performance monitoring system that includes the sustainability indicators that have to be reviewed every year and to perform its sustainability monitoring activities continually throughout the year. The project managers and business unit managers' report performances of the sustainability actions of engineers and employees in each business unit to the Quality and Sustainability management team every two quarters parallel with the implementation of CS programs.

Aside from determining a framework to develop CS programs for MECAL BV, this research also successfully determines the sources to foster the company's competitiveness by performing the sustainable development. MECAL BV can improve its competitiveness by following these aspects:

1. Integrating financial costs reductions planning into the program of CS (e.g. reduce the transportation allowance, reduce the office supplies consumption, energy-saving in the office, etc.).
2. Adjust and adopt the strategies of the business partners and customers.
3. Conduct supporting marketing activities for the new CS program to improve corporate image and reputation, as well as to increase the interest of qualified workforce.

Although many findings have been made in the area of CS, the understanding of CS frameworks can only be improved through studies directed towards the integration of a sustainability assessment as a process that precedes a planning step. The framework developed in this research strives to make

some progress in that direction. However, further empirical investigation is clearly necessary and desirable to demonstrate the applicability of the concepts proposed. Future research in this area should aim at the implementation of the framework for different company types.

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List of Abbreviations

AG	*Aktiengesellschaft* (German terminology for a stock corporation)
BV	*Besloten Vennootschap* (Dutch terminology for a private limited liability company)
cf.	*confer*/compare
CS	corporate sustainability
e.g.	*exempli gratia*/for example
et al.	*et alii*/and others
etc.	*et cetera*/and so forth
i.e.	*id est*/that is
ibid.	*ibidem*/in the same place (book, etc.)
ISO	International Organization for Standardization
MHOS	MECAL BV House of Sustainability
SWOT	Strengths, Weaknesses, Opportunities and Threats
US	United States

1. Introduction

Maintaining the balance between economic growth and social equity has been a major debate in business environments for most of the past decade (Manion, 2002). Many leading companies have recognized that being more sustainable will enhance business implications in the long run (Epstein, 2008). Driven by government regulations and pressures from society, companies nowadays are demanded to be more ethical and more transparent in doing their business (van Marrewijk, 2003). With the addition of the growing sensitivity in social issues (Epstein and Roy, 2003a), companies therefore increasingly need to develop new business strategies that facilitate sustainable growth. In this sense, companies are being encouraged to take greater responsibility on sustainable development that corresponds to more environmental and human-friendly artifacts (Epstein, 2008; Manion, 2002).

In order to be successfully sustainable, companies must be able to deal with the challenge of balancing between economic, environmental and social performance (Epstein and Roy, 2003a; Dyllick and Hockerts, 2002). In such perspective, companies are subjected to put efforts in developing programs that measure their social and environmental performance, while at the same time still delivering profits to their shareholders (Maon et al., 2009). The term "sustainability" itself has a basic definition as characteristic of a process, system or state that can be maintained at a commensurate level in 'perpetuity'[1]. Therefore, in this research, Corporate Sustainability (hereafter will be abbreviated as CS) is perceived as the company's strategy to conduct a perpetual and responsible business by aligning the company's objectives with three performance criteria of financial, social and environmental.

It is argued that to be able to properly implement CS, companies must adopt a proper framework to evaluate the suitability of CS initiatives in accordance to their own awareness and competences (van Marrewijk, 2003). Such a framework is perceived as facilitator for managers in deciding which strategies provide the largest benefit to both sustainability and economic performance. Indeed, the use of a CS framework has been an increasingly popular topic among scholars and business practitioners. Epstein and Westbrook (2001) argue that a CS framework can provide managers with a better understanding of the causal relationships of social and environmental strategies with corporate profitability (cf. Epstein and Roy, 2001). Moreover, a CS framework is argued to be able to facilitate managers in describing the drivers of corporate sustainability performance, the actions that can be taken to affect that performance and the consequences of those actions on sustainability and profitability (Epstein and Roy, 2003a).

Implementing CS for a company is, however, not a straightforward effort. There is no standardization of CS because CS is a custom-made process, and companies should choose which concept and definition is the best option according to their aims, intentions and strategies (van Marrewijk, 2003). In this sense, adopting a CS framework may be particularly cumbersome as they are usually associated with specific business strategies and

[1] The definition is taken from the original English definition of the word "sustainability"

environmental conditions. On the other hand, the differentiation of many archetypes of a sustainability framework for different business sectors is still limited. Therefore, in order to introduce a deeper understanding of a corporate CS framework in different types of companies and industries, a more specific area of study should be performed.

To fill incumbencies in the applicability of a CS framework in recent academic literature, this research is therefore conducted. It is directed to give a better understanding on how to apply corporate sustainability for different types of industries and geographical locations. To reach this purpose, the research is focused on MECAL BV as problem owner. MECAL BV is an international engineering company based in Enschede, the Netherlands that operates in three main activities, which are: providing consultancy services, manufacturing physical products and managing intellectual property (MECAL BV, 2010). For the purpose of this research, MECAL BV is categorized as a service-based company since the majority of its revenue is gained from consultancy services (de Roest and Burghuis, 2004).

The selection of MECAL BV as a problem owner is based on a threefold motive. First, MECAL BV runs a business-to-business operation in three different continents (i.e. Europe, Asia and North America) that makes the case rather appealing to be analyzed considering the fact that different geographical markets would have different social and environmental requirements or constraints. Second, MECAL BV provides services under three separate industries (i.e. wind energy, semiconductor and optical; see Appendix 5) that may concurrently lead the analysis into several industries within one company. Finally, MECAL BV has recently put its efforts into creating a CS program to be incorporated in its business strategies and corporate objectives, in order to retain its competitiveness in the market.

To summarize, this research focuses on a CS framework that has been an increasingly popular topic among both academic community and business practitioners. It elaborates each step of developing a CS framework by taking a case study of applying sustainable development programs to MECAL BV. The scientific contribution of this research will give insight on how an integrative CS framework may differ across industries and geographical locations.

1.1 Objectives

This research is designed to emphasize differences in the construction and implementation of a CS framework among industries in which the businesses operate. It is directed to fill the gap in the recent literature related to the subject, by introducing a CS framework into areas that have only been given little attention. Indeed, most of the available researches in an integrative CS framework (Manion, 2002; Fenner et al., 2006; Mihelcic et al., 2003; Epstein and Roy, 2001) are limited to companies operating in the manufacturing goods. Although many studies in this area have made progress towards the construction and implementation of a CS framework, they fail to give an understanding on how to generate and to implement such frameworks for a service-based company type.

Thus, the scientific objective of this study is to expand the existing studies in CS by shedding a light in determining appropriate sustainability initiatives in service-based companies. The research, which is performed in an international engineering service company (i.e. MECAL BV), is practically aimed to produce a CS framework that is useful to generate the most feasible, suitable and acceptable sustainability program that would enhance the company competitiveness. The output of the research should both add improvement to the current debate on the subject matter and provide managerial applications for the selected company.

1.2 Problem Statement

MECAL BV recently put its efforts into creating a CS program to be incorporated in its business strategies and corporate objectives in order to retain its competitiveness in the market and fulfill the requirement of its major customers (in particular, IBM; See Appendix 9 and 10). Therefore, MECAL BV needs to develop a CS program that is suitable with the company characteristics and aims. However, there is no framework specifically available to be adopted by an engineering service-based company such as MECAL BV. Applied research in MECAL BV should be conducted in a way that contributes improvement both for both the company and academic communities.

1.3 Research Question

In order to investigate an appropriate CS framework for a service company, the research question is designed as the following:

> *What is the framework to develop a feasible, suitable and acceptable corporate sustainability program for an international engineering service company (as MECAL BV) that simultaneously fosters its competitiveness?*

1.4 Research Strategy

Applied research is conducted due to its direct and immediate relevance to managers in MECAL BV. It is considered to be appropriate since it addresses the issue that a company perceives as important and able to act on (Saunders et al., 2009). This research is conducted in a deductive manner in which the research is carried out by using existing theories to develop a suitable method and approach that afterwards can be applied in order to test the arguments. In addition, since this research is also conducted for the purpose of learning how a sustainability concept might be practically applied in a company, this research might also be classified as a case study.

1.5 Thesis Structure

The following steps are designed to properly answer the research question. An extensive literature overview (Chapter 2) is conducted in order to obtain an overall picture of theories related to the research subject. Subsequently, a conceptual framework for developing a CS

framework is presented based on the theories reviewed. An assessment in the field is conducted (Chapter 3) by gathering data from interviews and questionnaires (i.e. primary data) and documentation analysis (i.e. secondary data). This assessment is made to give an understanding related to the current situation at MECAL BV. These findings are then analyzed and processed (Chapter 4) by means of a sustainability assessment. This is to determine the feasibility and potential values of future CS programs for MECAL BV. Next, the development of the designed CS framework that perceived to be the most suitable and acceptable for MECAL BV is elaborated as a sustainable development process of the company (Chapter 5). Finally, conclusions and recommendations for further research are presented (Chapter 6).

2. Theoretical Background

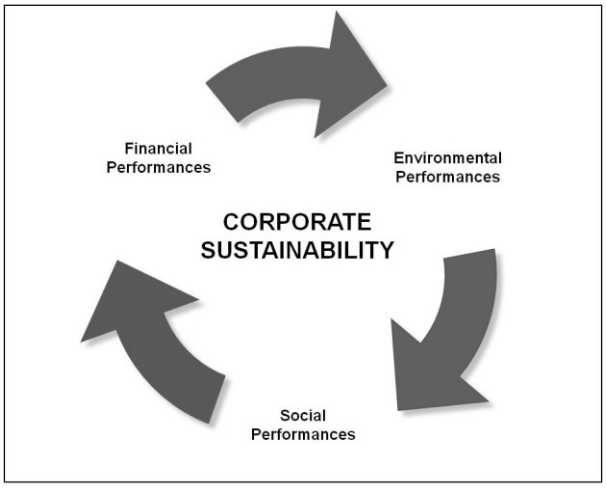
The term 'sustainable development' dates back to the early 1970s when certain communities began to argue against the negative implications of certain business activities towards the exponential growth of the human population and industrialization (Herkert, 1998). Furthermore, many government leaders were worried about resource depletion, excessive energy consumption, pollution and inappropriate technology transfer caused by several business activities (Manion, 2002). While the first responses to these issues were diverse, the supporters of sustainable development continued to flourish making it more difficult to ignore. Hence, many business actors cannot simply overlook this issue and need to address sustainable development with more serious actions. By scrutinizing several academic literature sources related to CS, this chapter elaborates the importance of sustainability concept and how to obtain the maximum benefit from it. It starts with an explanation on the basic definitions of sustainability and follows by an elaboration of the main activities of companies conducting a CS program. It continues with a brief overview of a sustainability concept within engineering communities, in order to demonstrate that sustainability in this realm is both frequent and pervasive. Based on the theories reviewed combined with relevancies of sustainability and engineering, a framework of CS in engineering companies is presented in the final part of this chapter.

2.1 The Definitions of Corporate Sustainability

The first eminent definition of sustainable development that is widely accepted is taken from the document of The United Nations World Commission on Environment and Development, named The Brundtland Report. It defines sustainable development as: *the development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (World Commission on Environment and Development, 1987; p.24). As such, the concept of sustainability concerns about *the adequacy and long-term viability of the prevailing approaches to progress, development, and well being* (Gibson et al., 2005; p.59).

Environmentalists, governments, or businessmen use the term 'sustainability' or 'sustainable development' to express the idea of how the economy and the environment should be managed adequately concerning the future generation, and these ethical concepts should express the desirable outcomes of economic and social decisions (Adams, 2006). In this sense, the concept of sustainable development is highly interrelated with corporations, as they are one of the major players in the economic system. Therefore Elkington (1994) argues that if real environmental progress were to be made, the concept of sustainability should be defined in a more integrated way and using familiar business terms. In 1994, the author coined the term *triple bottom line* stating that the major concerns of CS should be directed towards three main focuses, which are people, planet and profit (ibid.). In the following years, the term has gained popularity in both academic and business community (Elkington, 2004), which is the main reason that this research uses this definition as a further reference for CS.

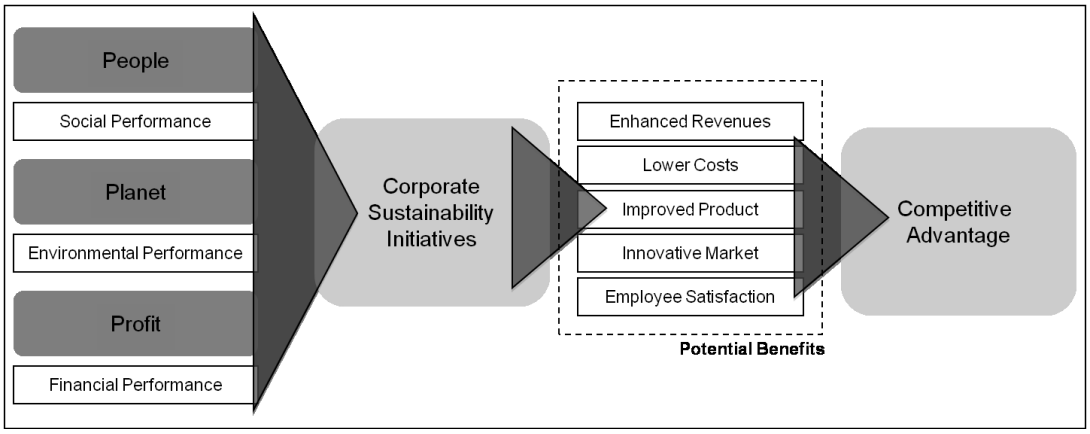
Improving the concept of the *triple bottom line* proposed by Elkington (1994), Epstein (2008) argues that the three elements determining the CS performance of a corporation are the corporate social performance, the financial performance and the environmental performance. The illustration of this concept is presented in Figure 1. In a similar notion, Adams (2006) argues that the main concern in the sustainable development is to integrate and incorporate three aspects of economic growth, environmental protection and the social progress. Therefore, by adopting the principles proposed by Elkington (1994) and Epstein (2008), this research perceives CS as the company's strategy to conduct a perpetual and responsible business by aligning the company's objectives with three performance criteria of financial, social and environmental.



Source: Self-constructed, adapted from Epstein (2008)

Fig. 1 Three elements determining the sustainability performance of a corporation

Many scholars in business studies have spent a considerate amount of time in determining the logic and motives behind the corporate ambition of managing a sustainable development program. Some authors argue that the implementation of corporate sustainability is not only driven by the mentioned three perspectives, but it is also determined by government regulations, industry's codes of conducts and the consideration of potential in creating value and competitive advantage for the company (Epstein, 2008; Berns et al., 2009). Indeed, some authors argue that companies are starting to concern sustainable growth because there are practical evidences supporting that it provides companies with many potential benefits. Both Epstein (2008) and York (2009) argue that CS programs could create financial value for the company through enhanced revenues and lower costs. The survey conducted by Berns et al. (2009) also indicates that improved company or brand image, increased employee satisfaction, improved product, service or market innovation, and strengthened stakeholders' relations, are perceived as benefits of implementing sustainability development programs. In short, more companies are now pursuing sustainable development not only as part of an obligation to the societal circumstances but also as an effort in increasing their competitive advantage.



Source: Self-constructed, adapted from Elkington (1994), Epstein (2008), York (2009) and Berns et al. (2009)

Fig. 2 The motives behind companies' decision in pursuing sustainability

The insights from these authors are summarized in Figure 2. Thus it is clear that CS should no longer be perceived merely as part of an obligation to environment and society. Rather, it has to be considered as a main element in building competitive advantage. In the next section, the implementation of sustainability principles into companies' daily operations will be explained by scrutinizing several academic literature sources so that the main points for implementing a CS to achieve competitive advantage can be identified.

2.2 Three Main Activities in Conducting Corporate Sustainability

As discussed in the previous section, CS has somehow shifted over the years from the companies' reaction to environmental and societal circumstances to a potential source of competitive advantage. Therefore many companies are now incorporating CS into their daily business activities. To be able to implement CS, van Marrewijk (2003) suggests that companies need to adopt a framework or strategies of CS according to their needs and circumstances. However, choosing the proper CS programs according to the needs and conditions of a company can be a challenging task. Within the business level, CS can be defined as *meeting the needs of the company's direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities etc.), without compromising its ability to meet the needs of future stakeholders* (Dyllick and Hockerts, 2002; p.131).

There are three main issues that need to be addressed in order to implement corporate sustainability within companies' business operations (cf. Elkington, 1994). First, companies must be economically sustainable which means that they must ensure the cash flow to be sufficient and provide benefits to the shareholders. Second, companies must be ecologically sustainable by consuming the natural resources at a reasonable rate and avoid engaging activities that can be harmful to the ecosystem. Finally, companies must be socially sustainable by adding value to their human capital as well as improving the societal capital within the surrounding communities.

In the realm of CS, many scholars have proposed different frameworks, models and strategies as part of implementing a sustainability program. These theoretical

methodologies vary on purposes, approaches and area of implementation. As an overview, these discrepancies are briefly summarized as follows. Some studies on framework development of CS emphasize the execution phase by providing a detailed description on how to implement the program (James, 2000; Epstein and Roy, 2003b; Epstein, 2008; York, 2009). Other studies are focusing on the sustainability performance monitoring and measurement activities (Robert, 2000; Mihelcic et al., 2003; Singh et al., 2009). Meanwhile, some other academic reports are rather focusing on adopting a framework according to specific industry or business practices such as the engineering area (Manion, 2002; Fenner et al., 2006; Cruickshank and Fenner, 2007).

While there are many available literature sources for CS frameworks, most scholars agree that there are three main activities determining the outcomes of sustainability initiatives of the company: planning, process or execution and monitoring (Epstein, 2008). Therefore, the following sections will elaborate these three activities in more detail.

2.2.1 Planning of the Corporate Sustainability

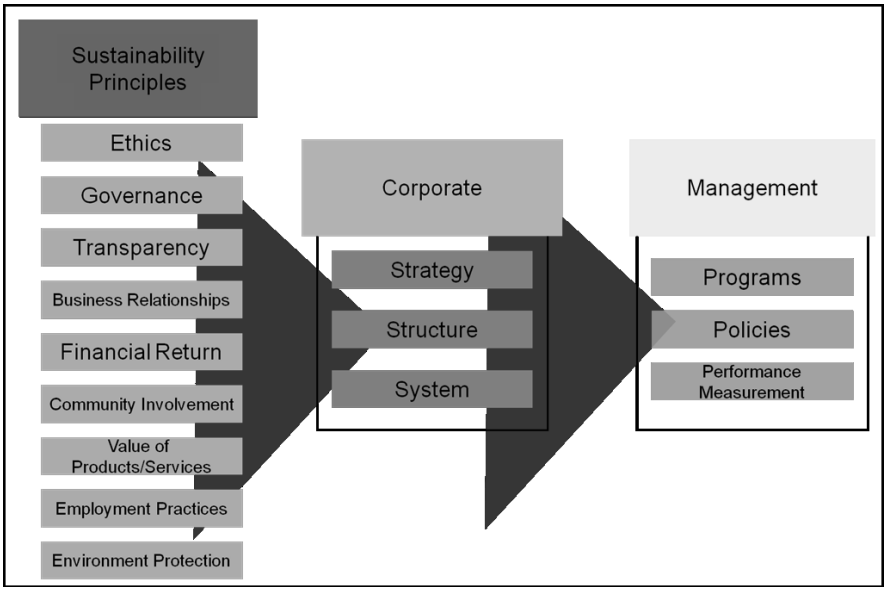
The first step in implementing a sustainability concept is planning. Within this step, it is important to integrate the principles of sustainability into the corporate strategy. As mentioned by Maxwell and van der Vorst (2003), CS planning should consider several aspects that align with the basic understanding of sustainability. Therefore, proper CS planning should cover the following issues: external context (i.e. regulatory, geographical), internal context (i.e. mission, strategy, structure, systems), business context (i.e. industry section, customers, products), and human and financial resources (Epstein, 2008). These issues will guide managerial decisions in improving the CS strategies.

One of the difficulties in the planning phase is to build an understanding with the shareholders on how corporate sustainability strategies will improve the company's value and will contribute to the net benefit of the company (Epstein and Roy, 2003a). This is a challenge for managers to ensure shareholders which strategies will provide the greatest advantage to both company and society. As such, the planning step of CS should include calculating of the costs and benefits for the sustainability investments. An analysis should be made towards several aspects (e.g. uncertainties in customers' preferences, potential changes in governmental regulations, etc.) so that a CS can be successfully employed (Berns et al., 2009).

2.2.2 Execution of the Corporate Sustainability

After the evaluation of inputs and the likely effects to the stakeholders as well as cost-benefit considerations, managers may execute a sustainable development for the company. As stated before, it is important to integrate sustainability principles into corporate main elements (i.e. strategy, structure and system). In order to properly implement a CS initiative in companies, Epstein and Roy (2003b; cf. James, 2000) propose that there are nine principles of CS performance that need to be integrated into companies' strategy, structure and systems. These nine principles are depicted in Figure 3. In the execution and

implementation phase, it is important for a company to formulate a set of sustainability statements and goals. As such, companies would have clear and defined rules regarding which areas sustainability activities will be directed in order to have a maximum impact on the company's value (Epstein, 2008).



Source: Self-constructed, adapted from Epstein and Roy (2003b) and James (2000)

Fig. 3 The execution of corporate sustainability

The goal of this step is not only to formulate the strategies to achieve the goals that have been formulated in the planning phase, the management team should design systems that can support performance evaluation and identification on the effects of sustainability initiatives (Epstein and Roy, 2003a). This is important since the next step in implementing CS, as will be discussed in the next section, is to monitor the performance of company sustainability initiatives.

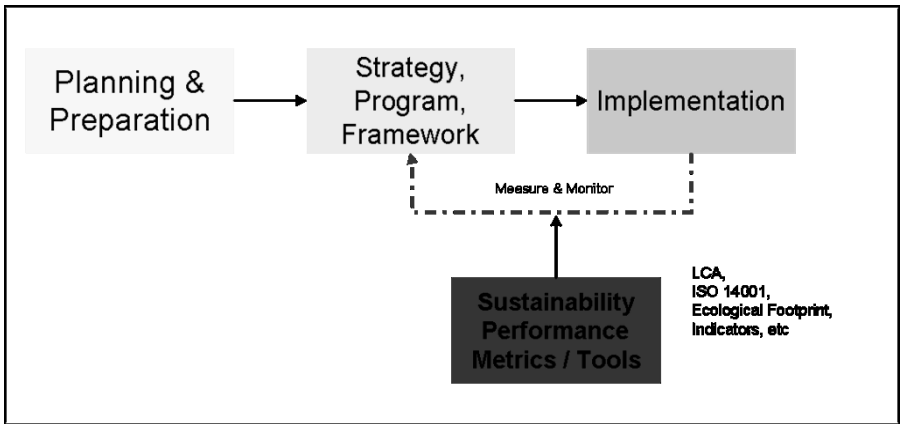
2.2.3 Performance Measurement and Monitoring of the Corporate Sustainability

The parallel activity with the implementation of sustainability CS is the monitoring process in which managers evaluate and improve the strategies. Not only a framework that is needed to implement the sustainability strategy, but managers also need sustainable metrics or tools for measuring and monitoring activities that will ensure the alignment of activities with values and objectives in the sustainability framework (Robert, 2000). Thus, measuring CS performance is as important as implementing the sustainability programs itself. As argued by Epstein (2008), performance measurement relates to the actual performance of the principles of sustainability and provides proper tools for generating feedbacks and corrective actions. Therefore, performance measurement is crucial for the continuous improvement of sustainability.

The sustainability performance is going to be assessed and integrated in the sustainability indicators and as such will be a guide to improve the sustainability level of the company. It can be included in the overall process of CS, as depicted in Figure 4. In practice, managers

may use indicators to define goals and targets for the implemented programs to improve their sustainability performance. This provides managers with a tool for analyzing feedbacks and applying corrective actions. By utilizing performance measurement, managers will also have the opportunity to examine how well the sustainability programs are contributing to the corporate value (Epstein, ibid.).

Performance measurement can be both centralized and decentralized (ibid.). In a decentralized method, the company transfers the performance measurement to business units, and then they decide how to manage it. In a centralized method, the company sets the performance measure attributes for business units to follow. This classification becomes an important issue in both planning and implementing CS because the corporate decisions regarding to determine sustainability strategy centrally or to be delegated to each business units will have an impact on performance evaluation and monitoring process.



Source: Self-constructed, adapted from Robert (2000)

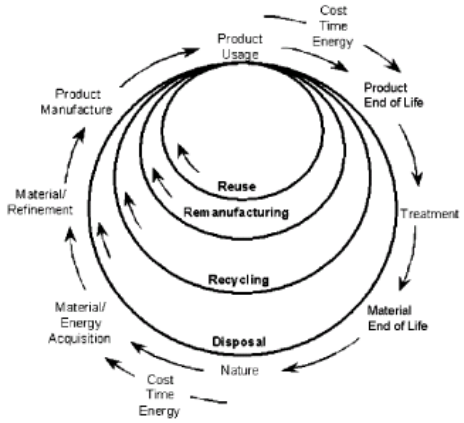
Fig. 4 The sustainability performance measurement

There are several methods of measuring sustainability performance that are available in academic literature. Some of them will be briefly summarized here. Mihelcic et al. (2003) use three aspects as indicators for performance measurement, based on the three pillars of sustainability that a company needs to achieve (i.e. economic, social and environmental sustainability). To indicate that a company is economically sustainable, these authors suggest that the main indicators are the productivity level, technological growth, profit and the employment rate. Meanwhile, the indicators for social sustainability are informed public and stakeholders' participation, social justice and equity and wealth distribution. Finally, environmental sustainability can be indicated by human health, ecosystem conditions, biodiversity and protection of natural resources. Using these indicators, managers can determine which activities are sustainable and which are not, so that further corrective actions can be foreseen.

Another theory is from Singh et al. (2009) who propose Sustainable Development Indicators (SDI) to anticipate and assess conditions and trends in the society and industry in which the company operates; provide early warning information to prevent damage in the aspects of economic, social and environmental; guidance in formulating strategies and communicating ideas; and to support the decision-making process. These authors also suggest that there are

two methodologies for conducting the sustainability assessment: The first method is called the monetary aggregation methodology that emphasizes on monetary valuation that represents the scarcity value of resources. This approach includes greening the GDP, resource accounting based on their functions and sustainable growth modeling. The second method emphasizes on physical indicators, in which the environment is being valued by its functions and economic welfare is measured in terms of the level of consumption.

Another tool to measure sustainability is the Life Cycle Assessment (LCA) as suggested by Mihelcic et al. (2003). According to these authors, LCA methods have been proven to successfully reduce waste, pollutants and energy use for a number of industries. The stages in LCA include four main activities, which are reuse, remanufacturing, recycling and disposal.



Source: Mihelcic et al. (2003)

Fig. 5 Product Life-Stages and 3R Improvement

Although academics have proposed many different approaches for the sustainability performance measurement, the common understanding is that performance measurement and evaluation systems should accomplish the logics of the sustainable principles. As such, the function of the performance measurement system should make sure that the sustainable strategy is to monitor employees' contribution to the success of the strategy and to facilitate the communication between organizations to ensure the success of the sustainability program.

2.3 The Corporate Sustainability Development in Engineering Communities

Following the publication of the Brundtland Commission report in 1987, the concept of sustainable development drew considerable attention among the international community. In Rio de Janeiro in 1992, The United Nation held a conference on environment and development, also known as the Earth Summit conference. This conference has encouraged the world to pay attention to sustainable development concept, and indicated the first international effort to draw up plans and strategies for moving towards sustainability (The United Nations, 1992). Since then, sustainable development programs are developing fast and on a global scale. This is as valid for engineering companies as well as for other sectors.

While the previous section has described in detail the three main activities on how to implement sustainability principles into corporate daily activities, the applicability of the method into different kinds of company archetypes remains unclear. Therefore in this section, the sustainability scope will be focused on the perspective of an engineering company. It is considered important to have this limitation since the research focuses on an engineering service company (See Chapter 1). This section will discuss the link between engineering and sustainability to present evidence that sustainability in the face of engineering activities is both frequent and pervasive.

According to Manion (2002), the engineering communities respond to sustainable development through two major actions. First, they develop sustainability programs through public policy statements of sustainable development. These public policies are derived from codes of ethics of professional engineering societies (e.g. Institute of Electrical and Electronics Engineers, American Society of Civil Engineers, etc.), engineering organizations that have a commitment to the environment (e.g. American Engineers for Social Responsibility, International Center for Technology Assessment, etc.). Second, they respond to sustainability issues by avoiding the production of non-sustainable technologies or through technological innovation.

The contribution of the engineering community to the sustainability concept is considered to be significant, especially in the past few years. Cruickshank and Fenner (2007) observed that engineers can have a major impact on sustainable development because engineers work within systems of providing products that society need and produce the infrastructure for both the environment and society. Apart from that, engineering communities are contributors to a sustainable world through cost-effective manufacture, waste-reduced manufacturing process and environmental friendly energy sources (Manion, 2002; Campbell, 2002). In short, engineering has the potential to translate knowledge into technological applications that are aligned with sustainability principles.

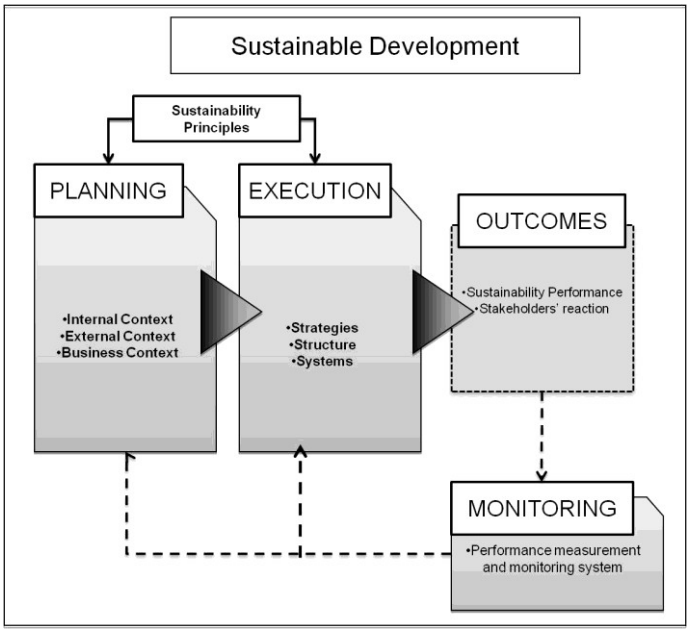
One thing to be considered, however, is that engineering is not a stand-alone and it is usually entailed within bigger institutions, and subjected to both legal and organizational constraints. For this reason, Manion (2002) argues that managers, corporate top-level executives, government regulators, customers and all stakeholders must play their part in supporting engineering's role in pursuing sustainable development. Only through this kind of commitment, engineering's capabilities can be utilized to provide real impacts in preserving the environment and to give positive contribution to the society (cf. Campbell, 2002).

After the roles of professional engineers in the concept of sustainable development are defined, Cruickshank and Fenner (2007) argue that engineers are still in need to re-identify and implement sustainability principles into their day-to-day activities. According to these authors, there are two aspects that need to be addressed in order to incorporate CS into an engineer's daily routine. First, engineers need clear guidelines for sustainable development actions. These guidelines ensure the activities of engineers to be correlated with sustainability principles. Second, it is important to have an engineering education regarding the requirements of sustainable development. This is to make sure that sustainability values are maintained and passed on to the next generation. Manion (2002) proposes a similar

notion by stating that integrating sustainability principles into engineers' day-to-day activities is crucial for preventing any unsafe design or unsustainable products. The following section will elaborate this process (i.e. incorporating sustainability principles into engineering day-to-day activities), by proposing a suitable conceptual framework for developing a CS program in engineering companies.

2.4 Developing Corporate Sustainability in Engineering Companies

As discussed earlier, it is clearly stated that most scholars agree on the proposition that developing a CS program should consider the following aspects: planning, process or execution and monitoring. This suggestion is adopted to develop a suitable CS framework, as proposed in Figure 6.



Source: Self-constructed, adapted from Epstein (2008), Epstein and Roy (2003b), James (2000), Robert (2000), and van Marrewijk (2003)

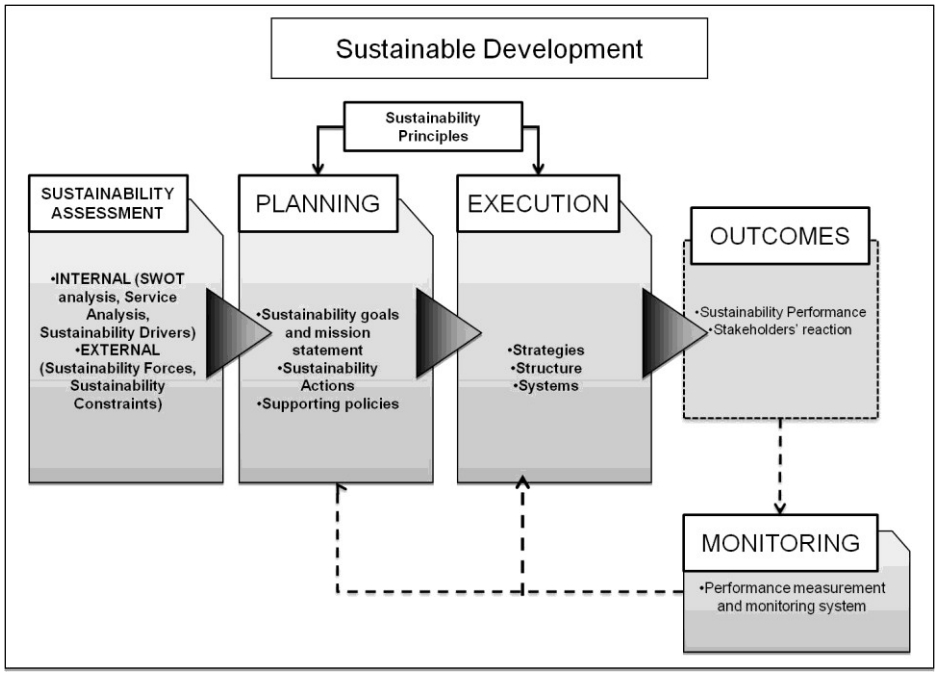
Fig. 6 The conceptual framework for developing sustainability programs

Based on the existing academic literature sources that are more focusing on the application of CS on manufacturing companies, CS can be obtained through three main activities. The first step is planning, in which external context (i.e. regulatory, geographical), internal context (i.e. mission, strategy, structure, systems) and business context (i.e. industry section, customers and products) are assessed. Afterwards, the company is ready to execute the sustainable development process by establishing the CS programs including the strategies and systems that can support the implementation process. As such, the supporting management system (i.e. CS performance monitoring system, responsible management team) should be planned. As for monitoring the outcomes, the company needs procedures that would ensure the alignment of the implementation with the initial CS ambition and objectives. A proper mechanism of performance monitoring and reporting can enable managers to monitor employees' contribution to the success of the strategy and facilitate the communication activities between organizations to ensure the success of sustainability

actions. In addition, other supporting activities to achieve the sustainability goals (e.g. socialization and communication) should also be considered.

Although the mentioned steps are comprehensive as those are considering all of the steps of planning, execution and control activities, they may not be sufficient to be directly implemented in this research. In order to employ a CS framework for an international engineering service-based company (as MECAL BV), changes and modifications are clearly desirable. To introduce a more suitable CS framework, considerations should be made based on the company's type and characteristics. This is in line with the proposition from van Marewijk (2003) stating that CS framework is a custom-made concept that has to be adjusted accordingly to the needs of the company in question.

The proposed CS framework that is available in most literature sources (Figure 6) emphasizes that the planning phase consists on incorporating sustainability principles into the company's internal context (i.e. mission, strategy, structure and products; see Section 2.2.1). While this is valid for companies operating in manufacturing goods, this may not be the case for service-based companies. As MECAL BV mostly provides engineering services, the available CS framework proposed by most literature cannot be directly implemented. This research argues that for service-based companies (as MECAL BV), an analysis regarding the readiness of the company to conduct sustainable development, by means the company's services as well as resources and capabilities, need to be determined before the sustainable development can be started. Therefore, several modifications especially in the planning phase should be made. A modified CS framework for an engineering service company (i.e. MECAL BV) is presented in Figure 7.



Source: Self-constructed, adapted from Epstein (2008), Epstein and Roy (2003b), James (2000), Robert (2000), and van Marrewijk (2003)

Fig. 7 The framework for developing sustainability programs in an engineering service company (i.e. MECAL BV)

As can be seen in Figure 7, this research introduces a CS framework that includes a sustainability assessment process, as well as modifications in the planning step. Sustainability assessment is the step that is preceding the planning step of a sustainable development that provides feasibility analysis of the company conducting sustainable development. This step consists of assessments of company's internal, external and business contexts regarding the aspects of sustainability. It is to ensure that the sustainable development is feasible in terms of resources, capabilities and opportunities. In other words, the sustainability assessment will confirm whether the company has sufficient resources to conduct CS programs, as well as give insight of potential opportunities that can be taken from the sustainability initiatives. After the analysis in this step shows that the company is feasible to conduct sustainability initiatives, the planning step can be initialized.

The planning step is basically determining the suitable sustainability principles that the company can pursue for its sustainable development and will be the standard when the program will be implemented. In this planning step, the company needs to determine its sustainability goals, sustainability mission statement, sustainability action guidelines and related policies. Supporting policies act as guidance that would facilitate the integration of the sustainability principles into the engineers' daily activities. As stated by Cruickshank and Fenner (2007), guidelines are crucial in order to successfully implement the sustainable development in engineering daily activities. A proper management planning would ensure the appropriateness of the CS programs of a company (cf. Cruickshank and Fenner, 2007; Manion, 2002; Campbell, 2002).

As for the execution and monitoring processes, this research employs the existing CS framework proposed by other scholars. The execution step contains a formulation of CS programs including the specific strategies, structures and systems. Meanwhile, monitoring activities are determined aligned with the execution of CS.

3. Research Methodology

3.1 Scope of the Research

For the purpose of this study, the research will be focused on MECAL BV, an international engineering company headquartered in Enschede, The Netherlands that recently puts its efforts into the creation of a sustainable development program to be incorporated in its business strategies and corporate objectives. MECAL BV provides services for three separate industries (i.e. wind energy, semiconductor and inspection system) and the company runs business in Europe, Asia and the United States (See Appendix 5). There are five business units of MECAL BV that operate mainly in the Netherlands and there are two subsidiaries that operate in Japan and The United States. As the practical objective of this research is to develop a suitable CS program for the entire company, the research scope will apply to both the business unit level and the corporate level. Moreover, to fulfill the scientific objective, the research is focusing on the service aspects of MECAL BV.

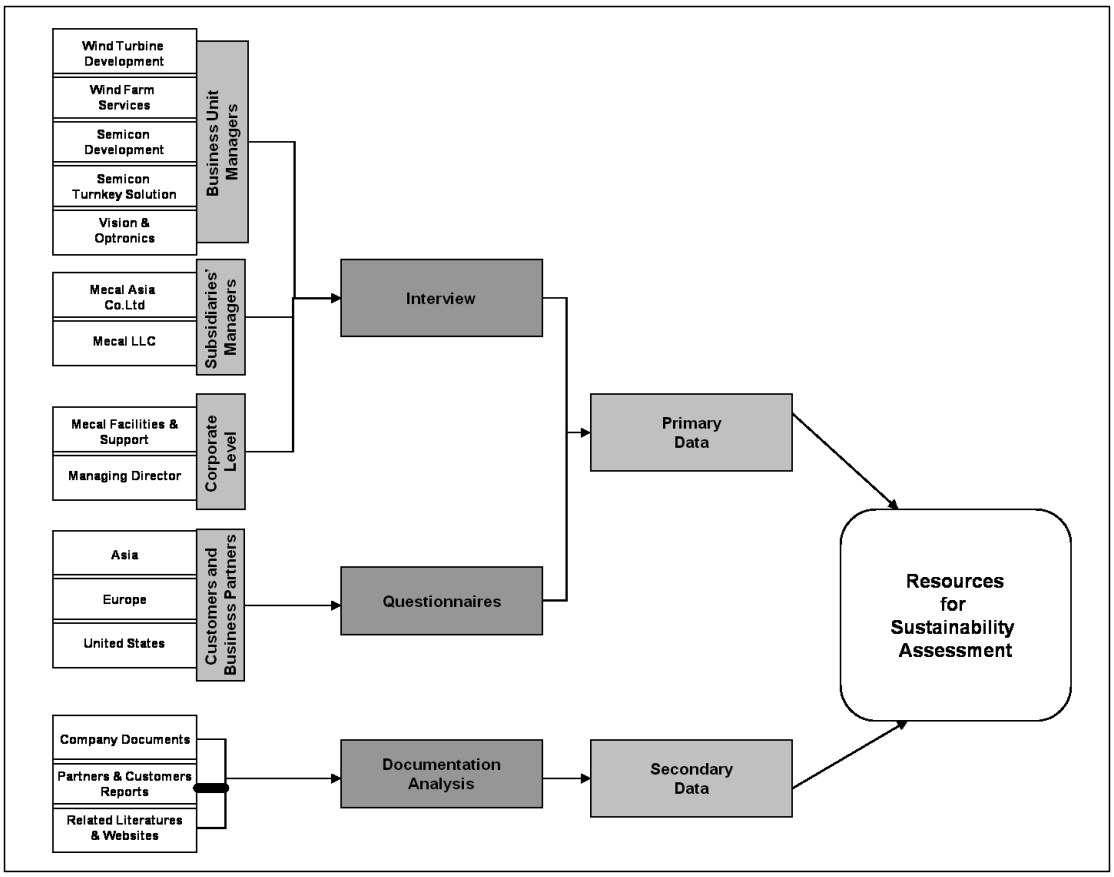
3.2 Research Approach, Design and Strategy

This research is conducted in a deductive manner and is carried out using existing theories in developing a suitable method and approach to conduct the research and analyze the data (Saunders et al., 2009). To support the fulfillment of the requirements of this research, a field experiment is conducted to better understand the nature of the problem, to gain deeper understanding of the research context by integrating different perspectives and utilizing multiple or a mixed research method design and types of data and to 'feel' what is actually happening in the real situation. As the research progressed and the study is designed and conducted to simplify our understanding of the problem in the purpose of knowing how a sustainability concept might be applied in a service-based company this study is classified as exploratory research and as a case study (ibid.). As such, a case study of MECAL BV is designed by adjusting the proposed concepts of sustainable development processes from existing studies to the company to achieve the essential purpose of the study to determine the framework for a suitable, acceptable and feasible CS for an engineering service-based company.

3.3 Data Collection Method

Qualitative data collection is conducted in order to gather all the information needed to support the objective of this study of formulating the framework of a suitable CS for a service-based company. Therefore, the data to be collected from MECAL BV are both from the business unit level and the executive management level. The information that is gathered is utilized to analyze and to investigate the internal, external and business context of the company that later on may be processed to support the sustainability assessment of MECAL BV's sustainable development.

As for the method of data collection, the primary data are gathered through direct interviews with related personnel in MECAL BV, a questionnaire for the customers and business partners, direct observation in company operations and discussions with management. The information gathered for the secondary data is assessed from company documentation, qualitative market analysis from related literature and reports of the company's partners and customers. Presented below (Figure 8) are the steps of data collection designed for this research.



Source: Self-constructed

Fig. 8 Data collection

3.3.1 Interview

The first step in collecting the data needed to plan the CS program is conducting interviews with top management in MECAL BV. As the objective of this study is to develop a framework to design a suitable CS program that is applicable for all the businesses of MECAL BV, collecting the primary data from the interviews will be conducted at three levels of the company: the business unit level, the subsidiary level and the corporate level. The interviews are designed to gain deeper understanding of each business process of the company and to achieve different perspectives from the leaders of MECAL BV regarding the implementation of CS.

Other than obtaining detailed information regarding the business process within the company, the interviews are conducted in order to achieve a shared ambition and objectives

towards sustainability among all top management in the company. This leads to the aim that they will educate and promote the strategy to all subordinates or employees that would facilitate easier strategy development afterwards.

3.3.2 Questionnaires

To remain competitive, MECAL BV needs to adapt to the surrounding partners and customers. The perspectives of clients and partners are valuable to be taken into consideration when designing a suitable CS Program for MECAL BV. A questionnaire form is distributed to the major customers and business partners of the company. The answers from the questionnaire are important to reflect the real situation regarding sustainability of the partners and the customers that should be adapted by MECAL BV.

3.3.3 Documentation Analysis

Information about the real situation at MECAL BV and the markets in which it operates is also accomplished by analyzing company documentation (e.g. employee manual books, business plans and reports), published documents of the business partners and customers (e.g. promotional materials, sustainability reports and official websites) and the literature related to the subject of sustainability in each industry. This analysis is conducted with the purpose of achieving information regarding the sustainability strategies of the partners and the customers of MECAL BV as well as trends in related industries that are valuable to considered in designing a suitable CS programs.

3.4 Data Processing and Analysis

MECAL BV is a company that provides services in engineering where the *services are dynamic, unfolding over a period of time through a sequence or constellation of events and steps* (Bitner et al., 2007; p.3). As such, all the processes should be analyzed carefully to determine the overall picture of the business and to obtain a higher level of detail within it. Even though the company perceives that a CS program needs to be developed, it is necessary to first conduct a thorough preliminary analysis to determine whether it is necessary to implement such a program. More essentially, it is important to determine whether the sustainable development is feasible. Therefore, the assessment of sustainable development feasibility, both internal and external to the company, should be employed. A sustainability assessment helps the decision-making process on determining whether or not an initiative can be defined as sustainable (Pope et al., 2004).

In this research, the results from data collection are being analyzed and processed as the sustainability assessment of MECAL BV. Sustainability assessment is an evolving concept (Pope et al., ibid) and it has two roles in the sustainable development: as an instrument to achieve sustainability and as sustainability benefactor in specific circumstances (Gibson et al., 2005). Within the sustainability assessment, the data are being analyzed through SWOT analysis, a service blueprint and custom-made matrixes that are developed to process the

company's data based on its triple criteria performances (i.e. financial, social and environmental).

3.4.1 SWOT Analysis

To achieve the purpose of this research, the sustainability assessment starts with determining whether the company is able to conduct a sustainable development, by exercising the familiar SWOT method of assessing the strengths and weaknesses associated with the opportunities and threats in the surroundings. As defined by Dyson (2004; p.632), *SWOT analysis aims to identify the strengths and weaknesses of an organization and the opportunities and threats in the environment*. The SWOT analysis is perceived to be able to generate a signal to indicate whether the company has sufficient internal resources and ability to conduct the sustainability initiatives corresponding with the situation in the external environment.

3.4.2 Service Blueprint

After determining that the company is feasible to conduct sustainable development, the assessment continues with the analysis of the services of the company. The service analysis is conducted by utilizing service blueprints that are generated from the information given by each business unit manager. The service blueprints are employed to describe the services in enough detail to analyze it carefully. According to Morelli (2006), a service blueprint, which represents the nature and characteristics of the interaction in the service, is the product of a design methodology that includes logical, time-related and physical connections between various phases and components of the system. For the purpose of this research, to understand the overall process of the services is considered important. The utilization of the service blueprint is enhancing the knowledge of the service processes within each business unit in MECAL BV. This is because a service blueprint is a map that visually depicts the service process delivery including the roles of people involved in providing the services, the roles of the customers, the points of customer contact and the physical elements of the services, so that the people involved in the processes can understand their roles objectively (Zeithaml et al., 2006). However, considering that the main purpose of this study is to discover the sources of competitive advantage for MECAL BV, the blueprints are designed from the customer's perspective. As such, the main analysis from the service blueprints focuses on the process of customer contact, the processes that potentially improved with the application of sustainability principles and the processes that can be the sources of competitive advantage for the company.

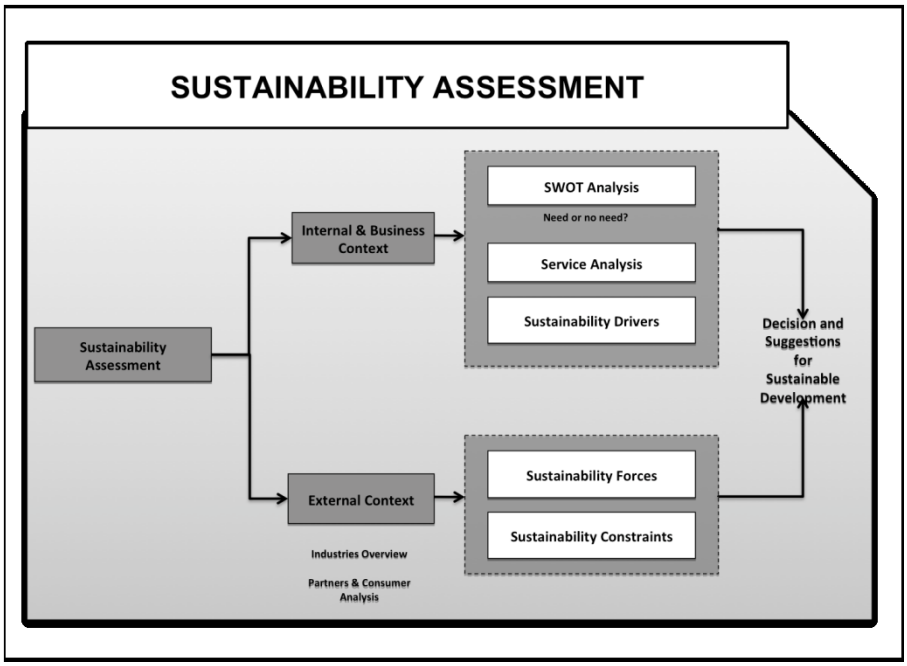
3.4.3 Matrix (self-constructed)

Parallel with the process of analyzing the services, the information regarding the sustainability issues from inside and outside the company is being processed based on the three criteria of financial, social and environmental to produce the sustainability drivers, sustainability forces, and sustainability constraints. Sustainability drivers are the factors that

internally will force the sustainability of the company, while sustainability forces are the factors that come from related industries, business partners and customers that force the development of CS. Meanwhile, as the company operates internationally, there are several requirements that apply in conducting the business. As such, the major considerations regarding sustainability in the international dimension of MECAL BV will be processed as the company's sustainability constraints.

4. Research Findings: The Sustainability Assessment of MECAL BV

This chapter contains the results from the data collection completed at MECAL BV. It includes interviews with business unit managers and executive management of the company, questionnaires to the customers and related secondary data (see Appendix 6, 7 and 8). In this chapter, the feasibility of sustainable development at MECAL BV is elaborated as a sustainability assessment process. According to Gibson et al. (2005), a sustainability assessment is a practical method to check whether the company has sufficient resources and opportunities to implement a sustainable development policy. As such, the sustainability assessment of MECAL BV includes all aspects of internal and external the company. The framework of sustainability assessment for MECAL BV is depicted in Figure 9 below.



Source: Self-constructed

Fig. 9 Framework for Sustainability Assessment

It is important to be aware of the surrounding trends and forces in order to develop suitable strategies and responses while also enhancing the inner strengths and potentials. In order to remain competitive in the market, a company needs to adapt to external factors such as the surrounding industries and partners and to align those factors with the internal strengths and objectives of the company. Therefore, the sustainability assessment is developed as resources of consideration in determining the suitable sustainability strategies and actions that need to be pursued by MECAL BV according to the drivers, forces and constraints which are involved in sustainable development.

4.1 Internal MECAL BV

MECAL BV is a Dutch engineering service company headquartered in Enschede, The Netherlands. MECAL BV operates with five business units and internationally runs businesses in three different industries: wind energy, semiconductor and visual inspection system (See Appendix 5). Currently, MECAL BV is coping with the specific requirements regarding sustainability initiatives from one of its major customers (in particular, IBM; See Appendix 9 and 10). Therefore, other than the intention of sustaining the environment, fulfilling the requirement from customers is one of the major motives behind conducting a sustainable development for the company.

The assessment of MECAL BV is started by determining the need and urgency of implementing sustainable development by analyzing the company's strengths, weaknesses, opportunities and threats through the SWOT analysis. After it is determined that the company needs to initiate sustainability actions, the sustainability assessment then continues by defining potential service processes to be integrated with the sustainability principles, and determining the sustainability internal drivers.

The data collected from the interviews (See Appendix 6) are processed as follows. The general information of the company is critically reviewed in SWOT analysis, specific information regarding the service processes is analyzed in the section of service analysis and the data categorized as the factors that have potential to drive the sustainability actions are processed as the company's sustainability drivers.

4.1.1 SWOT Analysis of MECAL BV

Houben et al. (1999) argue that in order to be successful, a company needs to acknowledge its internal strengths and weaknesses, as well as external opportunities and threats. The process of recognizing those factors is the basis of the SWOT analysis. Aligned with the practical purpose of this study, the SWOT analysis of MECAL BV is elaborated in Table 1. This is the initial step in determining the feasibility of the company to react to the trends and forces from the industries and business partners and to foster the competitive position in the market. Indeed, the SWOT analysis is perceived as one of the methods used to assist strategies formulation (Dyson, 2004).

The SWOT analysis of MECAL BV results by processing the data from the company's documentations (See Appendix 5 Overview of MECAL BV), the interviews with business unit managers of MECAL BV (See Appendix 6 The Report of The Interview Internal MECAL BV) and information regarding sustainability trends in the industries (See Appendix 8 Details of Industries Overview). Elaborated below is the table of SWOT analysis for MECAL BV.

Table 1 MECAL BV SWOT Analysis

Strengths	Weaknesses
• MECAL BV has more than 20 years of experience in wind turbine design and semiconductor business • International business leverage • MECAL BV is participating in producing renewable energy • MECAL BV provides full service coverage from idea generation, design and product development • MECAL BV is providing consultancy services that mostly harmless for the environment • Strong relationship with major clients in the semiconductor industry • MECAL BV employs more than 50 engineers within three business units • MECAL BV has motivated employees • Harassment-free and full respect on diversities working environment • MECAL BV has the ability to influence clients in developing their business • MECAL BV has the ability to cope with three different industries • There is support from the government regulations regarding renewable energy business • MECAL BV's financial performance has high solvency rate • MECAL BV has the ability to survive from world's economic crisis	• There is no international-standardized operation procedures that apply for all business unit • MECAL BV needs more local representatives in Asia and the U.S • MECAL BV has weak management structure • Lack off management professionals, MECAL BV is more likely to be a professional organization • The company growth and perpetuity depends on one-man in the organization • Need to have consistent ability to cope with macro financial situation • Poor documentation system and insufficient flow of management information • No sustainability actions or programs yet • Lack of awareness toward sustainability in employee level of the company
Opportunities	**Threats**
• Trend of sustainability initiatives within all of the related industries (i.e. wind energy, semiconductor and visual inspection system) • Reward for being sustainable from business partners • To increase competitiveness in the markets among the competitors • There are still many markets in Asia to be addressed relative to wind energy business of the company • To grow and conduct a sustainable business	• Macro-economic factors • Customer demands a sustainable supplier (i.e. IBM) • Forces from societies and governments regarding more environmental-friendly business operations • There are many existing and potential competitors appear in the markets with promising CS strategies • Losing customers

Source: Self-constructed (Processed from industries overview, documentation analysis and interview results with business unit managers of MECAL BV)

According to the SWOT analysis of MECAL BV depicted in Table 1, it is clear that the issue of conducting a sustainable business within the external environment of the company is perceived as both an opportunity and a threat. The situation is classified as a threat if the

major customers are only willing to conduct business with a sustainable company while MECAL BV has no sustainability program yet (while the competitors are pursuing sustainability strategies). However, the trend in the supply chain of initiating actions toward sustainability represents an opportunity for MECAL BV to start developing a CS that is suitable with characteristics and strengths of the company that can enhance the company's competitiveness. Therefore, MECAL BV has to be smart in developing its strategies.

The weaknesses of MECAL BV are elaborated in Table 1 in order to encourage the company to be aware of some limitations of the competences of the company that can hamper MECAL BV to achieve the opportunities to cultivate and to sustain its business performances. Relative to the opportunity to conduct sustainable development, the SWOT analysis of MECAL BV shows that MECAL BV has issues mostly on the management aspects that mostly lie on the aspects of system, strategic and financial. In addition, MECAL BV tends to be a professional company, not a managerial one as MECAL BV employs more engineers and less management professionals that can provide more support regarding strategic planning and development for the company's businesses.

Even though acknowledging the weaknesses means that MECAL BV needs to conduct several improvements within its operations, the weaknesses can prevail over the strengths. The strengths that are elaborated in Table 1 can be perceived as the resources and capabilities of MECAL BV to conduct sustainable development as well as to compete with its competitors, to fulfill the needs of its customers and to improve its business performances. Based on the SWOT analysis in Table 1, MECAL BV has sufficient resources and capabilities to conduct sustainable development and create CS programs that can boost its competitiveness.

The resources of MECAL BV to conduct sustainable development are the experiences of operating in harmless engineering consultancy industries business for more than 20 years, being supported by more than 50 engineers with broad engineering knowledge, having motivated employees, the relationships with the major key players in the worldwide markets and MECAL BV has been running in a sustainable industry (i.e. renewable energy industry). However, these resources are only constructive to improve the competitiveness if MECAL BV is able to manage, control and utilize them properly in accordance of sustainability principles.

Based on the fact that MECAL BV provides consultancies for its customers, MECAL BV has the capabilities to sustain the company as well as the customers' businesses. MECAL BV has the ability to persuade the customers towards sustainability actions and to integrate sustainability principles into the works that are delivered to the customers. In addition, based on the graphic of financial performances MECAL BV 2007 – 2010 (See Appendix 5), MECAL BV has the capability to survive and promptly improve its performances towards the macro financial situation of the world's economic crisis in recent years.

As the opportunities are discovered and the resources are perceived sufficient in the SWOT analysis, it is clear that MECAL BV is feasible to conduct sustainable development.

4.1.2 Service Analysis of MECAL BV

Unlike manufacturing companies, the businesses of MECAL BV are mostly intangible. MECAL BV provides engineering consultancy and services the results of which are mostly only experienced by its business partners and customers. As such, to integrate the sustainability principles within the business processes, it is important to understand the service delivery processes. In this research, the services are mapped and analyzed carefully by utilizing service blueprints. The goal is to determine which processes should be improved to have better competitive advantage and which processes have potential to be integrated with sustainability principles.

There are two main points interpreted from the service blueprints produced from the interviews with the business unit managers (See Appendix 6). The first point is information on processes within MECAL BV's services that have the potential to be integrated with the sustainability principles. MECAL BV is an engineering service-based company that provides consultancies; therefore the impact on integrating sustainability principles will have both internal and external effects on the company. By integrating sustainability principles into the process of projects completion and delivery, it provides benefits not only for MECAL BV but for its partners as well. According to the services blueprints, the sustainability principles might be integrated in the following processes:

- The process of direct contact with the customers (e.g. project order, negotiation, discussion, contract dealing, etc.)
- The process of the engineers working on the projects (e.g. design, production, suggestion or solution, etc.)

Within the processes that involve direct contact with the customers, one of the sustainability principles such as conducting transparent business might be applied (e.g. fair business transactions, transparent project reporting, etc). Meanwhile, within the processes of the engineers working on projects, the sustainability principles should be reflected in three key aspects: design, production and solution. Per se, the engineers in every business unit are encouraged to develop profitable product designs that utilize advanced technology and environmental-friendly raw materials; exercise the production system and processes with higher production rate, more efficient resources-consumption, higher energy-saving capacity and more cost-effective; and provide solutions that improve sustainability to all stakeholders. In addition, for internally at MECAL BV, the sustainability principles might be also practiced through the corporate culture and daily office activities such as waste management and office supplies consumption.

The second point is the information of which processes in MECAL BV's services have the potential to be improved in order to gain competitive advantage. To be more specific, competitive advantage includes the aspect where costs can be reduced, the corporate image can be enhanced and the profitability can be maximized (cf. Epstein, 2008; Berns et al., 2009). From the service blueprints, the operation costs might be reduced with a more efficient communication system between the head office in The Netherlands with the subsidiary in Asia and clients all over the world. Furthermore, the profit for each project can

be improved by applying the most efficient travel arrangements. Meanwhile, the image of the company can be improved by promoting the sustainability program through the company's communication media (e.g. business cards, company website, brochures, e-mail signatures, etc.).

4.1.3 Sustainability Drivers of MECAL BV

In this research, sustainability drivers are defined as one of the company's strategies to conduct a perpetual and responsible business by aligning the company's objectives with three performance criteria of financial, social and environmental. Based on the perspectives from business unit managers in MECAL BV (see Appendix 6), the sustainability drivers are listed in Table 2. To support the purpose of this research, the drivers are classified in the three sustainability aspects (i.e. financial, social and environmental) in order to align the results with the research purpose of developing a suitable sustainability program.

Table 2 Internal Drivers for Corporate Sustainability

Internal Drivers	Wind Energy		Semiconductor		Vision Inspection	Executive Management
	Wind Turbine Design	**Wind Farm Services**	**Semiconductor Turn Key Solutions**	**Semiconductor Product Development**	**Focal Vision Optronics**	
Financial	• Products and services quality • Human Investment • Brand Image	• Advice / Service quality • Brand Image	• Products and services quality • Brand Image	• Technology invention & improvement • Products and services quality • Brand Image	• Business process and standard of operation • Product innovation • Products and services quality • Brand Image	▪ Customer and market orientation ▪ Product- and Market innovations as business model ▪ Mobility and location accessibility ▪ Co-operation and contracts ▪ Sponsorship
Social	• Social acceptance • Equality of employment opportunity (diverse workforce) & Respect on Human Rights • Relationship with customers	• Social acceptance • Brand image that support H.R- recruitment • Industry association • Employees and working environment • Equality of employment opportunity (diverse workforce) & Respect on Human Rights	• Employees and working environment • Relationship with customers • Supply chain • Equality of employment opportunity (diverse workforce) & Respect on Human Rights	• Employees and working environment • Employees codes of conduct • Relationship with customers • Equality of employment opportunity (diverse workforce) & Respect on Human Rights	• Employees and working environment • Relationship with customers • Supply chain • Equality of employment opportunity (diverse workforce) & Respect on Human Rights	▪ Communication with Stakeholders and in MECAL ▪ Create chances in training and development ▪ Health and safety and working environment ▪ Transparency integrity, reliability
Environmental	• Indirectly generate Renewable energy resources • Daily office supplies	• Indirectly generate renewable energy resources • Daily office supplies	• Product shipping-Air-Freight • Daily office supplies	• Daily office supplies	• Daily office supplies	▪ Waste and recycling

Source: Self-constructed (Taken from interview results with executive management and business unit managers of MECAL BV)

Based on comparison between the managers' perspectives elaborated in Table 2 and four months direct observation of MECAL BV, some results are notable. Most of the factors that drive the company to be financially and socially sustainable already exist within the company (e.g. technology inventions, quality improvement, harassment-free workplace, respect on employees cultural diversities and human rights, etc.). However, MECAL BV's intention to be an environmentally sustainable business is still substandard as MECAL BV only applies a simple waste management system in the offices. According to the arguments from the business unit managers (See Appendix 6), the business operations in each business unit only produce indirect impact to the environment and societies through their customers. There are no common understandings among business units regarding environmental protection actions (e.g. waste management, energy consumption, material selection, etc.).

4.2 External MECAL BV

The process of sustainability assessment should cover all aspects of a company, because the interaction and inter-correlation of those factors might define the viability and durability of the overall CS in the future (Gibson et al., 2005). Therefore, the related industries, business partners and customers of MECAL BV should also be assessed in this research. In this research, the assessment of external aspects of MECAL BV is processed through two aspects: the sustainability forces and the sustainability constraints.

4.2.1 Sustainability Forces of MECAL BV

Sustainability has become one of the priorities in industries related to MECAL BV (See Appendix 8). On a macro level, governments are aware that the wealth of nations not only depends on the economic situation but also depends on the environment and human resources within them. The production of renewable energy resources and products with higher energy-saving capacity has become an international major concern. Governments perceive industries with the capability to produce renewable energy and higher energy saving capacity as businesses that not only foster the economic development but also provide benefits for the people while also protecting the life cycle of the environment. At the micro level, sustainability has also become one of the major requirements to be competitive in the markets. MECAL BV has been required to perform a sustainable development by its major customers (in particular, IBM, see Appendix 9 and 10).

Considering both situations at the macro and micro levels of surrounding MECAL BV, there is a positive indication confirming that there is urgency for MECAL BV to conduct a sustainable development. However in order to perform a suitable and competitive sustainable development, MECAL BV needs to consider both the trends in related industries and the sustainability programs of its business partners and customers.

4.2.1.1 Sustainability Trends in the Industries

According to the information available regarding the wind energy industry (See Appendix 8), the external forces and trends that drive the sustainability initiatives of companies involved in wind energy are briefly summarized here. Growing market demand for renewable energy resources, governmental forces and regulation for greener energy production and incentives from producing green energy have become the financial drivers in the wind energy business. As a social consideration, the growing business also presents bigger opportunities of employment and a greater force to be involved with the surrounding society. The ability to combat climate change, reduce global pollution and reduce the world's fossil fuel consumption has been the environmental consideration for conducting the business in the wind energy sector.

Within the semiconductor industry, technologies are now being used to facilitate applications in many industrial sectors as part of addressing the challenge in reducing energy consumption and protecting the environment. As also argued by Laitner et al. (2009; p.7), *there is no doubt that semiconductor production and services – perhaps exemplified by the rapid growth in the role of information and communications technologies in the global economy – have played a critical role in reducing energy waste and increasing energy efficiency throughout the economy.*

The environmental concerns of the semiconductor-based applications have impacted upon many semiconductor manufacturers. Hence, the trends in the semiconductor industry that forced the companies to initiate sustainability actions are classified in three aspects. Firstly, the factors that foster financial performance are product innovation, especially for less energy consumption devices, and technology to produce higher-quality products with lower prices. Secondly, the impacts of the growing business for greater employment opportunities, more serious attention towards employee's health and safety, improvement of overall human's life quality and specific policies on sustainable partnerships have been the social drivers for companies to initiate sustainability actions. Finally, the companies' abilities to produce advanced products or devices with higher energy-saving capacity and the companies' knowledge to support renewable energy production are the drivers for the company to protect the environment.

Meanwhile, according to the information from MECAL BV, the Vision and Optronics business unit is new and still needs further development of its internal strategies and objectives. As human vision often has limited accuracy and cannot be used to evaluate changes in visual appearance, the visual inspection system, which is one of many uses of optical technology, is useful to produce qualified and flawless products. As such, to shed a light about the situation in this industry, a brief overview regarding the industry of visual inspection system can be found in Appendix 8.

4.2.1.2 Sustainability Actions of Partners and Customers

Although there are no generalized solutions for all, it appears that many companies in wind energy, semiconductor and visual inspection system have made progress towards the

adoption of environmental concerns into their daily business activities. Not only because of the forces from governments' regulation, companies are already aware of the importance of conducting a balanced business. Furthermore, companies are aware that in order to have a long-lasting business, they have to sustain resources from the environment and surrounding societies. These companies are also aware that protecting the environment could not be done in isolation and therefore they need partners to assist them. More and more companies are applying the sustainability requirements to their partnership agreements. Therefore, MECAL BV, as part of the supply-chains in these industries, has to carefully consider their requirements and strategy in order to keep its competitive position.

The sustainability actions taken by the customers and business partners are being classified as the external forces. The external forces are presented in the Table 3 below. Aligned with the sustainability drivers, the external forces are also classified in the same sustainability dimensions: financial, social and environmental.

Table 3 External Forces for Corporate Sustainability

External Forces	Vestas	Alstom	E.On	ASML	IBM	HITACHI	CARL-ZEISS
Financial	• Certified Management system (ISO 14001 *& OHSAS 18001)	• Products and Services	• Technology on existing Plants	• Products- more energy-efficient machines	• Product Stewardship	• Certified Management system (ISO 14001) • Promote Eco-Products	• Efficient business process
Social	• Occupational Health and Safety • Suppliers codes of conduct • Business Transparency on performance and environmental impacts • Local community approach	• Labor Standards • Business Ethics • Occupational Health and Safety	• Human Rights • Health and Safety • Procurement	• Employee Safety on production sites • Suppliers sustainability performance requirements	• Sustainability requirements for Suppliers	• Employee environmental training • Environmental Communication to partners and public	• Safe Production
Environmental	• Products production & Shipment • Waste Disposal • Reduction of CO2 Emission • Ability to reduce global CO2 emissions and	• Environment Impact	• Biomass Purchasing • Environmental Management	• Reduction of CO2 Emissions • Waste Recycling	• Product materials selection • Waste Management	• Production rules – restriction on banned chemical substances on the product • Prevent Global Warming • Efficient resources consumption • Promote super eco-factories and offices • Reduce CO2 emissions	• Waste Management • Material selection criteria • Reduction of environmental impact

Source: Self-constructed (Taken from secondary data and questionnaires results) .

This section is developed to provide a better perspective on sustainability actions taken by the partners and customers of MECAL BV. Acknowledging the strategies of the partners and customers are important for developing competitive strategies that align with the needs of the customers. The information regarding sustainability actions taken by the partners and customers of MECAL BV are elaborated below.

Vestas (Wind Energy- Europe)

Responding to the situation in the industry, several major players in the wind energy business developed various sustainability strategies adjusted with their values and objectives. Vestas, as one of the world's major players in the wind industry located in Denmark, focuses its sustainability initiatives into the aspects of the environment and health & safety. Vestas incorporates sustainability policy and safety issues in its development of products and processes (Vestas, 2010), elaborated as follows:

- Maintaining a certifiable management system according to ISO 14001 and OHSAS 18001,
- Communicating knowledge about the environment,
- Exercising occupational health and safety and improvement of health to employees and other stakeholders,
- Measuring and documenting the impacts on the employees and surroundings, being transparent and preparing an annual external environmental statement to United Nations Global Compact for Vestas Wind Energy Systems and
- Ensuring that Vestas' activities comply with national legislation and respect the Danish law wherever possible as the Vestas standard. In addition, Vestas employed a specific policy to reduce impact on the external environment and to improve occupational health and safety throughout the Vestas Group

Alstom (Wind Energy-Europe)

Another leading company in the wind energy sector having a sustainability program is Alstom. In succeeding in its business strategies, Alstom developed a sustainable development charter that focuses on all partnerships with Alstom's suppliers and sub-contractors (See Table 3). Alstom's Charter for sustainable development and its suppliers and sub-contractors (The Charter) was developed with the purpose to encourage related partners to take part in the sustainable initiative and together develop continuous improvements and innovation (Alstom, 2010). Elaborated below are the main contents of the Charter:

- Labor Standards: the set of principles of employment standards including the restriction of child labor, minimum level of wage, non-discrimination environment and respects for employees rights and freedoms
- Ethics: the ethical set related to the business activities and environment of Alstom and the suppliers or sub-contractors that cover the issues of competition, corruption, money laundering, conflict of interest and gifts.
- Environment

- Occupational Health and Safety
- Products and Services

The CS program of Alstom that focuses on pursuing sustainable partnerships has to be considered because it emphasizes the urgency of MECAL BV to conduct a sustainable business.

E.On (Wind Energy- Europe)

According to Mr. Christoph Kraft[2], E.On emphasizes the development of cleaner energy, carbon footprint reduction and technology in existing plants by formulating E.On policies and standards govern the following five areas (E.ON, 2010): Environmental Management, Human Rights, Responsible Procurement as well as Biomass Purchasing, Health and Safety and Community Strategy (See Table 3 for the details).

E.On integrates sustainability within the company internal operations through several procedures and policies that are established to integrate a more sustainable business such as the codes of conduct and the internal systems for monitoring and compliance in order to ensure the responsibility of each business action (E.ON, 2010). The answers given by Mr. Christoph Kraft in the questionnaires (See Appendix 7) show that E.On CS program has been absorbed throughout the company, as the personnel, including him, understand the purpose and strategies of the CS. According to him, the government regulations, general public acceptance and technology are the major issues to be concerned; because if not, they will become the roadblocks for sustainable development. Moreover, openness, clear strategy and willingness to share knowledge are the key success factors of a sustainable development.

E.On is perceived to be successful in integrating its sustainability strategies into the minds and attitudes of its employees. Therefore, E.On sustainability strategies are a good benchmark for sustainable development of MECAL BV.

ASML (Semiconductor- Europe)

The idea of using semiconductors as a medium of energy saving has induced manufacturers to act towards sustainability. The leading European company, ASML, has taken one step forward by implementing sustainability into four main areas (ASML, 2010: depicted in Table 3), which are:

- Production Sites, by reducing CO_2 emissions and improving waste recycling
- Products, by committing to more energy efficient machines
- Safety and social, by improving safety both in their products and production sites
- Suppliers, by monitoring the sustainability performance of their suppliers

[2] Source: The Questionnaire filled in by Mr. Christoph Kraft (Technical Excellence – WTG of E.ON Climate & Renewables, Germany) on 16th November 2010.

Those major attentions in ASML CS regarding the efforts to reduce CO_2 emissions, to improve waste management and safety procedures require adoption by MECAL BV since ASML is one of the major customers of the company.

IBM (Semiconductor- U.S)

IBM exercises a global Environmental Management System (EMS) that emphasizes the corporate environmental affairs policy, reporting and verification management system (e.g. ISO 14001) and supporting guidelines (e.g. Business Conduct, Supplier Requirements, etc.) (IBM, 2010). IBM published its Supplier Conduct Principles (See Appendix 9 and 10) to articulate the company's overall supply chain social and environmental requirements.

The requirement from IBM to its suppliers, including MECAL BV, has been one of the major reasons for MECAL BV to consider development of its CS program. Therefore, it is important to acknowledge the IBM requirements so that MECAL BV can take proper action.

Hitachi (Semiconductor-Asia)

Hitachi focuses its sustainability strategies on three aspects: next generation products and services, eco-mind and global environmental management and worldwide environmental partnerships. Depicted below are the Hitachi Environmental visions toward a sustainable society (Hitachi Group, 2010).

There are three highlights in the sustainability actions of the Hitachi group (Hitachi Group, 2010):

1. Prevention of Global Warming by reducing the CO_2 emissions production
2. Conservation of resources by products re-use and recycling
3. Preservation on ecosystem by reducing the negative effects on water, air and soil

Hitachi High -Tech Fielding Corp Japan initiated sustainability strategies both at corporate group level and at company level. HITACHI group has a Corporate Social Responsibility (CSR) program that should also be supported by all the companies within the group, including the practice of ISO 14001 certification. At the business level, Mr. Ichiro Kawamurai[3] states that the company integrates sustainability principles in their manufacturing rules setting the restriction to use banned chemical substances in products, etc. (See Appendix 7). However, the high cost of investment in the sustainability program and the lack of qualified manpower to monitor the sustainability progress have become major roadblocks in the company's sustainable development.

As such, for a big global corporation such as Hitachi, different approaches on the implementation of a CS program occur between the corporate level and the business level. Based on the information given by Mr. Ichiro Kawamurai, a company needs different implementation approaches to better fit with each of the objectives and strategies. Mr. Kawamurai perceived that the success of a CS program must be supported both by internal and external aspects of the company. Internally, it is important to have the same

[3] Source: The questionnaire filled in by Mr. Ichiro Kawamurai - International Sales manager of Hitachi High -Tech Fielding Corp Japan on 8th November 2010

understanding of every employee towards the importance of the CS program and the ability to act and sustain the program. Externally, the cooperation towards shared objectives on sustaining the environment of all related parties from a supplier to an end user is crucial to support the success of sustainable development of a company.

The arguments from Mr. Ichiro Kawamurai show that Hitachi has successfully integrated its sustainability attitude toward the employees. MECAL BV should put attention on the implementation process of its sustainability management, especially, in the process of integrating the concept into the attitude and the perspectives of the employees.

Samsung (Semiconductor-Asia)

Through the Green Memory program, Samsung is improving its semiconductor technology to be able to operate with less power requirement. It has achieved as much as a 70% energy reduction (Samsung, 2010) without compromising any performance. From that program, it is clear that Samsung has realized that early initiatives and actions towards the environment will foster their business efficiency and effectiveness.

Carl Zeiss (Visual Inspection System- Europe)

The optics industry has undergone a quite similar path as wind energy and semiconductor industries in pursuing sustainability. Among many companies in this industry, Carl Zeiss is probably one of the companies that significantly embodied sustainable development in their day-to-day business activities. Their commitment is based on a philosophy to operate without using any environmentally critical materials or production methods (Carl Zeiss AG, 2010). Furthermore, Carl Zeiss set up a performance evaluation system of sustainability so that their actions towards sustainability are constantly monitored and documented.

4.2.2 Sustainability Constraints of MECAL BV

MECAL BV is an engineering service-based company with worldwide customers, suppliers and partners and it is obligatory for MECAL BV to comply with both local and global rules and regulations regarding the businesses conducted in related locations. Elaborated in this section through the focus matrix are the key issues of sustainable development within the local context for each business area of MECAL BV.

Table 4 Local Sustainability Constraints

MECAL BV	Wind Energy Business	Semiconductor Business	Vision Inspection Business
The U.S.	• Advanced knowledge • Quality certification and verification • Renewable energy trend • Supply chain • Business partnerships • Health and Safety procedures	• Shipment regulation • Concerns on environmental effects • Product Quality • Supply chain • Sustainable supply chain • Service level and relationship with customers • Shipment regulation • Local production site	- (no significant constraints to be considered)
ASIA	• Working culture adjustment • Production rate of wind turbine • Project time-delivery • Price-related concerns • Active participation in renewable energy association • Social acceptance in site projects • Environment impact from offshore tower • Wind turbine -design regulation • Supply chain • Business partnerships	• Price-related concerns • Local production site • Shipment regulation • Product Quality & Guarantee	- (no significant constraints to be considered)
EUROPE	• Health and Safety procedures • Accredited reports • Efficient travelling • Work efficiency • Wind turbine -design regulation • Renewable energy trend • Supply chain • Business partnerships	• Supply chain • Service level and relationship with customers • Quality certification and verification • Project time-delivery • Product Quality & Guarantee	• Language concerns in product's user manual • Quality certification and verification

Source: Self-constructed (Taken from interview results with business unit managers of MECAL BV)

By only focusing on the factors that applied globally, the sustainability constraints are simplified in Table 5.

Table 5 Global Sustainability Constraints

MECAL BV		Wind Energy Business	Semiconductor Business	Vision Inspection Business
Global	**Financial**	• Providing solutions on sustainable business performance to the customers	• Sustainable supply chain management • Advanced products quality and service excellence (also consider the ISO management system) • Certified Products and Services	• Approach on local contents
	Social	• Compliance of local law and regulation • Comply with Health and Safety Regulations	- (no significant constraints to be considered)	- (no significant constraints to be considered)
	Environmental	• Actively involved in Renewable Energy Association	• Local production sites with more efficient shipping process	- (no significant constraints to be considered)

Source: Self-constructed

Hence, in order to have global suitability, MECAL BV has to comply with all the factors considered as the global constraints that listed in Table 5.

4.3 The Feasibility of Sustainable Development at MECAL BV

"A sustainable business creates its own future by producing positive impacts on the environment and to the people who live within it" (Eric Kamphues, Business Unit Manager of Wind Farm Services MECAL BV)

Based on the interviews (See Appendix 6), most of the staff in MECAL BV are ready to support the company's intention of performing a sustainable business. Moreover, they have subconsciously developed their own definitions regarding sustainable business practices. However, a good intention is not sufficient to determine whether a company is feasible to implement sustainable development. A CS development is perceived as feasible when the intention to cope with the external requirements is supported by the internal strengths and resources. The sustainability assessment confirms that it is feasible to implement sustainable development in MECAL BV and MECAL BV has the abilities to do so. Elaborated below are the resources and capabilities of MECAL BV that makes the sustainable development feasible to be implemented in the company:

1. MECAL BV has sufficient resources to implement sustainable development. The resources of MECAL BV to conduct sustainable development are:
    - MECAL BV has been running in the renewable energy industry
    - MECAL BV is equipped with more than 50 engineers with broad engineering knowledge,
    - MECAL BV has been operating in harmless engineering consultancy industries business for more than 20 years
    - MECAL BV has close relationships with the major key players in the worldwide markets (e.g. Vestas, IBM, ASML, Hitachi, Samsung, etc).
2. MECAL BV has the capabilities to generate and initiate sustainability actions. These sustainability actions are designed not only to respond to external forces and to remain competitive in the market and attract its customers but also to integrate the sustainability values with the core business strategies of the company. The capabilities of MECAL BV are:
    - MECAL BV provides consultancies for its customers; as such MECAL BV has the capability to persuade the customers towards sustainability actions
    - As MECAL BV is equipped with more than 50 engineers, MECAL BV is capable to integrate sustainability principles into the works that are delivered to the customers.
    - MECAL BV also has the capability to survive and promptly improve its performances towards the macro financial situation of the world's economic crisis in recent years.

As MECAL BV is feasible to implement sustainable development, there are several suggestions to be considered. The suggestions are made based on the internal factors in the

company (See Section 4.1), and the external factors (See Section 4.2). Following are the suggestions for MECAL BV:

1. Since MECAL BV is classified as a service company; MECAL BV is advised to integrate the sustainability principles in the processes that involve direct contacts with the customers (e.g. project order, negotiation, discussion, contract dealing, etc.) and in the process of the engineers working on the projects (e.g. design, production, suggestion or solution, etc.).
2. As the initial intention of MECAL BV to implement a sustainable development program is to match the requirements from their customer (in particular, IBM; See Section 4.1.1). It is advised that MECAL BV adopts the strategies pursued by its partners and customers resulting from the external sustainability assessment.

Based on these results obtained from the sustainability assessment, to implement the suitable and acceptable CS development in the company, MECAL BV needs to develop sustainability programs that supported with suitable strategies and systems. The suitable strategies for MECAL BV have to actualize its internal drivers, match its external forces and comply with its global constraints and be aligned with the company's sustainability goals.

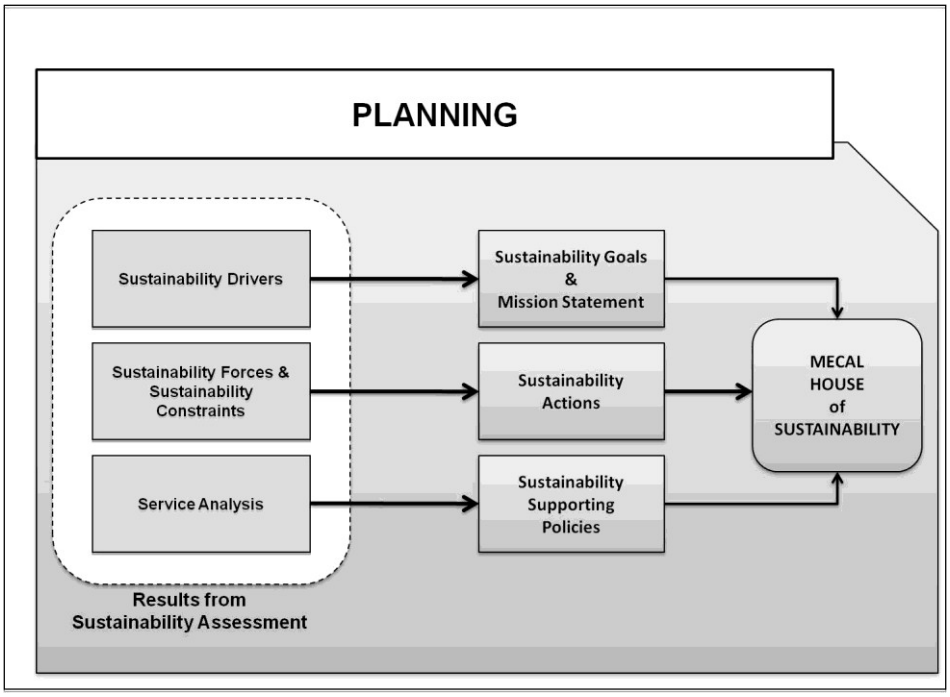
5. Sustainable Development of MECAL BV

As the previous discussion regarding MECAL BV's sustainability assessment determines that sustainable development is feasible to be implemented, MECAL BV is advised to immediately start developing its CS programs and to perform its sustainable development.

A sustainable development step for MECAL BV after the feasibility of the company is defined is planning. The planning step includes the formulation of MECAL BV's sustainability principles. After the planning, the next step is the execution of sustainable development. The execution step is a step in which the CS programs are set to be implemented afterwards. In this step, suitable sustainability strategies, the structure and the system that are required to successfully implement the program are also determined. As the execution of CS is an ongoing process, MECAL BV needs to perform monitoring activities to ensure that the implementation runs aligned with the planning. Meanwhile, to facilitate improvement and perform transparent business, appropriate reporting activities are mandatory for MECAL BV. In each step of sustainable development at MECAL BV, the management should be informed and involved to ensure that the CS program is acceptable for the company. Finally, the CS framework is reviewed for its suitability and acceptability.

5.1 Planning

In the planning step, MECAL BV needs to determine the basic principles of its sustainability initiatives, or what may be called the sustainability principles. The sustainability principles are the goals, guidelines and policies that will be the standard when the program will be implemented. As the objective of this research is to develop a suitable and acceptable CS programs for MECAL BV, it is important to first define the goals for developing the CS programs. Afterwards, MECAL BV needs to set the guidelines that will support the company's actions to achieve those goals (i.e. action guidelines and supporting policies). As such, this planning step includes steps of determining MECAL BV's sustainability goals and mission statement, a set of guidelines for corporate sustainability actions, and several supporting policies toward sustainability. The planning activities to develop CS program for MECAL BV are illustrated in Figure 10.



Source: Self-constructed

Fig. 10 Framework for Planning Sustainable Development

The results obtained from assessing MECAL BV's sustainability drivers should be considered to formulate the company's sustainability goals and mission statement. To achieve those goals, a set of guidelines for sustainability actions needs to be designed in such a way that this is matched with the sustainability forces and constraints. In addition, by considering the main findings of the service analysis in the sustainability assessment, several supporting policies needs to be formulated as these will facilitate engineers to easily integrate sustainability principles into their daily activities and will support the achievement of the company's sustainability goals. As such, MECAL BV should consider suggestions that were previously produced in the sustainability assessment (see Chapter 4) and are summarized in Table 6 below.

Table 6 Considerations for Sustainable Development of MECAL BV

Internal Company Consideration	
SWOT Analysis (Section 4.1.1)	MECAL BV needs to achieve the opportunity and be able to comply with the requirement from the major customers (e.g. IBM) tostart developing sustainability programs
Service Analysis (Section 4.1.2)	• The engineers in MECAL BV should play the vital role in sustainable development of the company • MECAL BV needs to integrate the sustainability principles in the processes in which the engineers work on projects and in the processes that involve direct contact with customers • MECAL BV is suggested to improve the efficiency of several operation processes in order to enhance its competitive advantage
Sustainability Drivers (Section 4.1.3)	• MECAL BV needs to sustain its progresses on its financial and social performance (e.g. technology inventions, quality improvement and human resources related activities) • MECAL BV should start to act on activities related with environmental protection
External Company Consideration	
Sustainability Forces (Section 4.1.4)	• It is mandatory to acknowledge the area of businesses in which governmental forces are highly involved (e.g. renewable energy production and services, business with safe production process, business that produce products with higher energy-saving capacity, etc) • MECAL BV needs to adopt the strategies pursued by its partners and competitors regarding financial, social and environmental actions: 1. Financial enhancement through certified products and continual technology innovation 2. Social engagement through sustainable suppliers requirements, business transparency, human resources development and put attention on the issues of health and safety 3. Environmental preservation through safe production, reduction of environmental impacts and responsible waste management • MECAL BV needs to exercise a supporting sustainability performance control system
Sustainability Constraints (Section 4.1.5)	In order to comply with the requirements of MECAL BV operation in everywhere the company operates: • MECAL BV must comply with local law and regulations • MECAL BV needs to conduct business and provide solutions in sustainable manners (e.g. effective project delivery, higher production capacity with lower resources and actively involved in social communities) • MECAL BV must have its products and services to be certified by accredited management system

Source: Self-constructed (Based on the results produced in Chapter 4)

By considering the results and demands from the company's sustainable assessment that are presented on the table of considerations above, MECAL BV will be ready to start planning its CS programs.

5.1.1 Sustainability Goals and Mission Statement

Determining the company's sustainability goals is the first step on planning a CS program for MECAL BV. The sustainability goals of MECAL BV are the major objectives of the company to conduct sustainable development.

Based on the results of MECAL BV's sustainability drivers (see Table 6), there is one major barrier that MECAL BV needs to overcome in order to be sustainable: MECAL BV has to start performing actions to protect the environment. However, despite of only considering this environmental aspect, it is better for MECAL BV to set its sustainability goals based on the three-fold aspects (i.e. financial, social and environmental). In order to conduct a perpetual and responsible business, MECAL BV needs to align these triple criteria of performance. Thus, sustainability goals for MECAL BV are set as:

1. Sustainable relationships
2. Environmental protection
3. Viable business

In additions, to actualizing the goals, MECAL BV needs to commit itself to achieve those goals. Therefore, the sustainability mission statement of MECAL BV should read as follows:
"*It is our mission to achieve a sustainable living for the small planet that we live in by conducting responsible engineering practices. We sustain relationships with partners that also embrace ethical business practices, we endeavor to help protect the earth by implementing responsible production processes and wise material selection and we foster our economic performance through a greener corporate culture."*

The sustainability goals and mission statement given above reflect the perspective of MECAL BV towards the subject of sustainability. In other words, the sustainability goals and mission statement form the sustainability identity of MECAL BV in relation to its business partners, customers and public in general. The proposed goals and mission statement are mandatory for MECAL BV as they properly fit with the "people-planet-profit" principle of sustainability proposed by Elkington (1994) and comply with the definition of CS as they support a perpetual and responsible business practice and align the triple criteria of performance(i.e. financial, social and environmental).

5.1.2 Guidelines for Sustainability Actions

In pursuance of achieving the sustainability goals (i.e. sustainable relationships, environmental protection and viable business), MECAL BV needs to formulate guidelines for its sustainability actions that are compatible with the sustainability forces from the company's partners and customers, and consider the constraints regarding its international operations. As such, by analyzing the considerations towards the sustainability forces and constraints that presented Table 6, it is concluded that:

- To be financially sustainable: MECAL BV needs to continue developing advanced innovation, to achieve quality improvement of products and services and to take advantage of government regulations

- To be socially sustainable: MECAL BV has to put more attention on the aspects of employment (e.g. health and safety procedures, codes of conduct, incentives, etc.), enhance the relationship with the customers, strengthen the supply-chain by complying with suppliers' requirements and participate in industry association while also approaching the surrounding societies.

- To be environmentally sustainable: Since MECAL BV mostly provides services that are harmless to the environment, MECAL BV needs different approaches. MECAL BV needs to protect the environment inside and outside the company:
    a. Inside the company, MECAL BV should pay attention to reducing the office supplies and waste management.
    b. For the external environment, MECAL BV needs to actively participate in renewable energy production. In addition, MECAL BV needs to encourage the partners and suppliers to protect the environment together, or in other words, MECAL BV should play the role as a sustainability partner.

Those conclusions above are important to be considered by MECAL BV in order to perform a sustainable business. Therefore, MECAL BV needs to establish a set of action guidelines toward its sustainability initiatives. The set of action guidelines that will support the achievement of sustainability goals are elaborated in Table 7.

Table 7 Sustainability Action Guidelines of MECAL BV

Sustainability Actions Guidelines

Goal: Sustainable Relationships

The sustainability action guidelines for MECAL BV's to achieve the goal of conducting sustainable relationships are:

1. MECAL BV acting as the partner for innovation and sustainability empowerment means that MECAL BV will be sustainable as the company is empowering the sustainability of the partners and customers businesses. There are two possible ways to conduct that strategy:
    a. MECAL BV encourages suppliers, partners and customers to conduct sustainable business and comply with MECAL BV requirements to act more responsibly, waste wisely and produce effectively through technological innovations on more environmental-friendly products
    b. MECAL BV improves customers' sustainability performance. This could be done by:
        - Providing services and products to the customers to reduce their costs by minimizing the use of their resources and impacts on the environment of their processes (improve the customers' efficiency).
        - Understand their sustainability challenges and provide solutions that help them to lower their costs or improve their sustainability performance
2. Embrace business transparency and ethical business cooperation, including transparent public reporting
3. Never risk the issue of health and safety of the employees and all the stakeholders

Goal: Environmental Protection

The sustainability action guidelines for MECAL BV's to put actions in protecting the environment are:

1. Reducing the CO_2 emissions and carbon footprints through advanced design, responsible production and wise material selection
    a. Deliver the profitable product designs that utilize advanced technology and environmental-friendly raw materials;
    b. Exercise the production system and processes with higher production rate, more efficient resources-consumption, higher energy-saving capacity and more cost-efficiencies;
    c. Provide solutions that improve the sustainability of all the stakeholders.
2. Always comply with law and regulations
3. Wise energy consumption for the office operation
4. Conduct better waste management

Goal: Viable Business

The guidelines for MECAL BV's actions toward viable business practices are:

1. Apply and perform (integrated) Quality Management System
    a. Provide qualified products and certified services
    b. Perform business align with ISO 9001:2008, 14001:2004 and OHSAS 18001:2007
2. Cost-effective business operation
    a. More efficient travel arrangements
    b. Effective and efficient communication system
3. Enhanced Promotion and community event sponsorships
    a. Actively participate in industry association
    b. Support the society events
4. Employee Trainings and Personal Developments
    a. Provide trainings and workshops of sustainability
    b. Provide opportunity for trainings and additional certification program to enhance the employees' knowledge and skills
5. Vigorous financial performance
    a. Enhanced corporate image by more branding activities
    b. Efficient project delivery
    c. Standardized working procedures
    d. Integrity and transparency
6. Green corporate culture
    a. Reduce-reuse-recycle
    b. Good housekeeping
    c. Energy saving and efficient workspace

Source: Self-constructed

Only by developing programs based on these proposed action guidelines, the sustainability goals of MECAL BV can be attained.

5.1.3 Sustainability Supporting Policies

The engineers of MECAL BV play the main role in the sustainable development of an engineering service-based company (see Table 6). Based on the analysis in Section 4.1.2, the area in which the sustainability principles can be integrated in a service company is in the process of the engineers working on projects. As proposed by Manion (2002), integrating sustainability principles into engineers' day-to-day activities is crucial to prevent any unsafe design or unsustainable products. As such, in the context of sustainability initiatives, supporting policies are the main aspect that a service company has to emphasize on. These policies are the media to turn the company's sustainability values tangible. The supporting policies are guidelines and ethical procedures that engineers must comply with when working on projects, sales people must obey when conducting any business transaction and all the other stakeholders must embrace for all tasks related with the business of MECAL BV. Furthermore, supporting policies are the guidelines and rules to be complied in order to achieve the sustainability goals of the company.

Hence, the required policies that will facilitate the achievement of the sustainability goals of MECAL BV are:

1. Production Policy
   The production policy is developed to achieve the goals of protecting the environment and improving the viable business. This policy is developed to overcome the eco consequences of products of the Semiconductor business of MECAL BV. The major concerns that should be included in this policy are:
   a. Sites and Shipments
      The sites selection will determine the environmental impact of the production. To achieve the goals of the company sustainability initiatives, MECAL BV should prioritize its sites selection based on the distance to the customers. The closer the production sites will reduce the environmental impacts caused by the transportation of the product and the wiser production sites will improve the relationship with surrounding societies
   b. Process and Materials Selection
      The policy includes proper procedures of production and wise materials selection process facilitating the aim of conducting responsible production, reducing the CO_2 emissions, carbon footprints and other environmental impact caused by the production processes and preserving the resources for the next generation
   c. Health & Safety
      MECAL BV will not risk the health and safety issues of both employees and the production process. Specific rules and regulations toward the issues of health and safety need to be implemented in all of the areas where the employees work (e.g. the office, production sites, wind farm, etc.). Also additional prevention programs such as insurances need to be issued to sustain a satisfactory rate of employees' occupational health and safety.

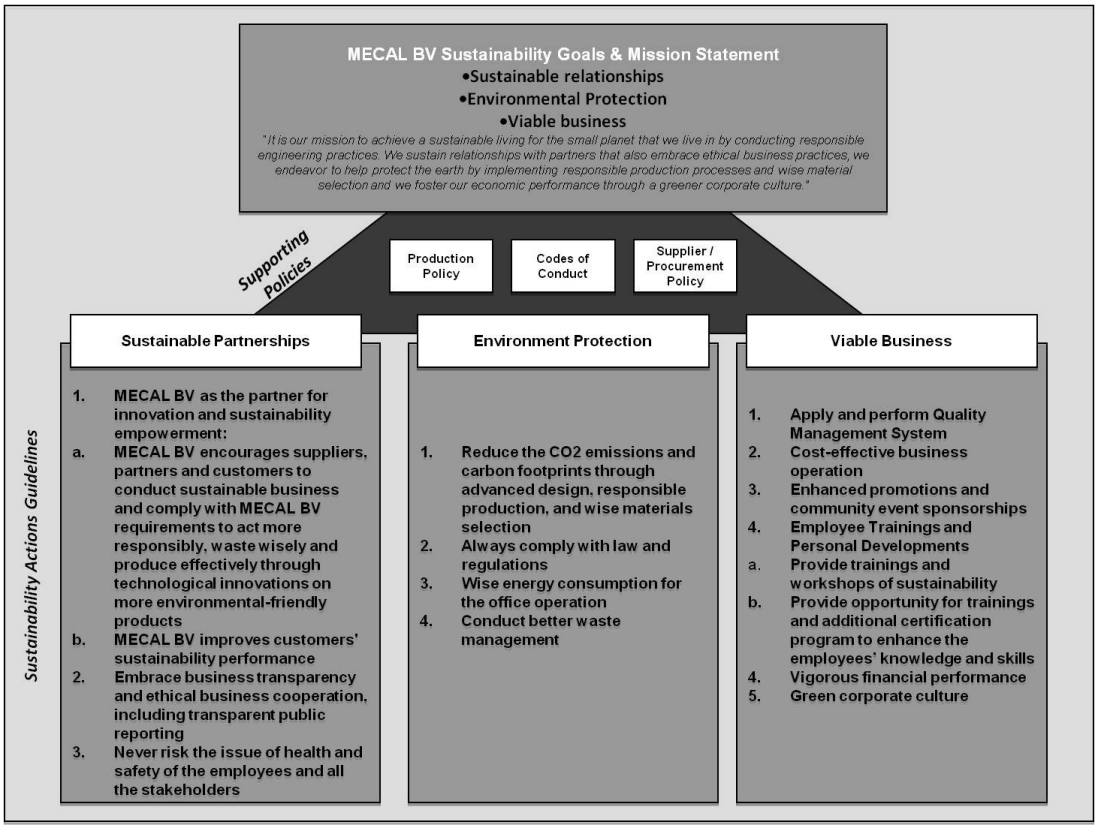
2. Procurement / Supplier Selection Policy
   MECAL BV plays the role as a sustainability partner and it needs to encourage the partners and suppliers to protect the environment together. Even though it is one of the sustainability goals of the company to conduct sustainable relationships with the customers and business partners, the company still needs to protect the environment. And, protecting the environment is not a one-man-task; MECAL BV needs the partners to conduct a sustainable business, or at least to implement a responsible business that takes care of their environment impacts. By this policy, MECAL BV also requires the suppliers and business partners to conduct a sustainable business. In addition, the policies regarding an ethical business cooperation with the partners and suppliers needs to be elaborated in codes of conduct.

3. Codes Of Conduct
   Codes of conduct elaborate values, set clear standards and provide guidance as to the manner in which MECAL BV wishes to act with regard to its customers, partners, employees, the people acting on behalf of MECAL BV and society in general. MECAL BV's codes of conduct should embrace the sustainability principles of conducting transparent business practices without bribery and corruption and responsible acts of preserving the environment.

The required policies for production, procurement and health & safety are aligned with the sustainability goals of MECAL BV. These supporting policies are the most feasible media to reflect the integration of sustainability principles into the company's objectives and activities. Therefore, MECAL BV needs to adopt these policies and specify the details on its further sustainable development.

5.1.4 Corporate Sustainability Principles of MECAL BV

The objective of planning a sustainable development is to set goals, as well as to design guidelines of actions and policies to achieve those goals. Hence, as the sustainability goals have been set, the guidelines of actions have been planned and the supporting policies have been formulated, CS of MECAL BV is then ready to be implemented. The CS principles for MECAL BV (MECAL BV House of Sustainability / MHOS), are depicted in Figure 11.



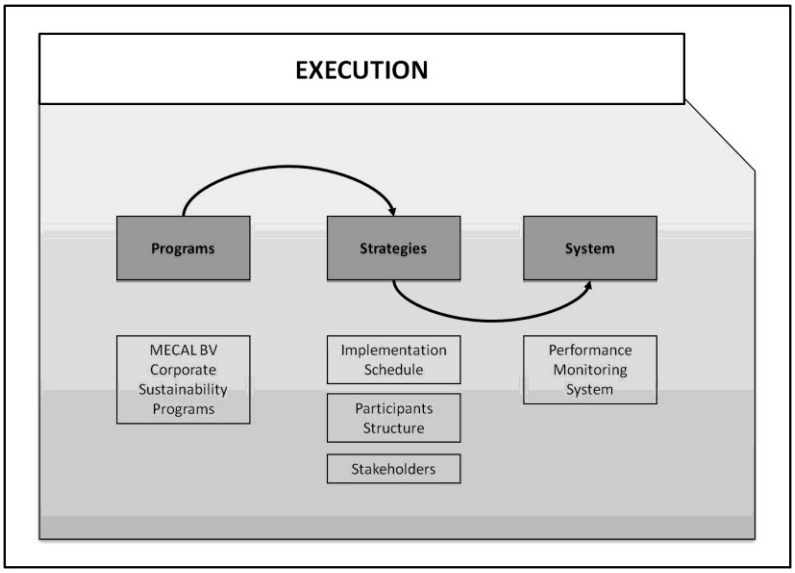
Source: Self-constructed

Fig. 11 MECAL BV House of Sustainability

The sustainability goals are the objectives for implementing CS initiatives in the business of MECAL BV. The sustainability action guidelines are designed to foster the achievement of those goals and to overcome the challenges on company's sustainability drivers and constraints. Based on the research results obtained in the service blueprints, the most appropriate way to integrate the sustainability principles in the service processes is through the process where engineers work on projects. The supporting policies act as the media for reflecting the sustainability principles integration and as the guidance for conducting the planned sustainability actions. By developing all these basic principles of the company's sustainable development, MECAL BV's sustainable development is ready to be executed.

5.2 Execution

The framework for executing sustainable development at MECAL BV is depicted in Figure 12.



Source: Self-constructed

Fig. 12 Framework for Executing Sustainable Development

In short, the execution of MECAL BV's sustainable development is being determined through answering the 3W + 1H: What, When, Who and How. 'What' refers to the specific program that MECAL BV has to pursue in order to achieve the sustainability goals, 'When' relates to the periodical time of the CS program, 'Who' is explained as the staff concerned related with and responsible for the CS program, and 'How' is elaborated as the process of designing a supporting system and activities to ensure a successful implementation of CS.

5.2.1 Corporate Sustainability Programs for MECAL BV

The execution process starts by setting the CS program for MECAL according to the goals and capabilities inside the company. In this research, a starter set of CS programs for MECAL BV is defined.

According to the direct observations in the company and the results of the SWOT analysis (see Section 4.1.2), there is still a lack of awareness toward sustainability among the engineers and employees in MECAL BV. Therefore, the main objective of the starter CS program for MECAL BV should emphasize to first pursue sustainability inside the company by creating a sense of urgency to conduct a sustainable business among the employees, especially the engineers.

As CS is a new program for the staff, there are two points to be considered to facilitate a smooth implementation. First, the program has to be integrated with the staffs' existing activities. Therefore, it is recommended that MECAL BV integrates CS programs within the projects in each business unit and the office's daily activities. An integration of CS programs into the company's quality management system of CS programs into project deliveries will foster the sustainability performance of MECAL BV (see Table 6). Second, it is mandatory to relate the implementation of the CS program with incentives. MECAL BV needs to be cooperative with its Human Resources Division to offer trainings for the staff and provide incentives for those employees implementing the program aligned with the CS goals,

guidelines and policies. Integrating a CS program as an effort for human resources development will foster the sustainability performance of MECAL BV (see Table 6, the considerations for sustainable development of MECAL BV from sustainability forces).

Based on the analysis above and based on the sustainability action guidelines (see Table 7), this research leads to the following starter CS programs for MECAL BV:

1. The Orientation of MECAL BV's Corporate Sustainability to all levels of the company.
   The program to create a sense of urgency toward sustainable development can be performed through:
   a. A kick-off meeting (presided by managing director) with the executive managements, including business unit managers and the general manager for subsidiaries of MECAL BV
   b. Trainings or meetings for engineers of each business unit regarding sustainability programs and policies

2. The Practice of In-Office Green Corporate Culture.
   This program can be achieved through:
   a. Office waste management
   b. Energy saving regulations
   c. Reduction of office supplies consumption
   d. Travel and transport regulations

3. The Integration of sustainability principles into quality management system and human resources management.
   This CS program can be realized through:
   a. Including the following environmental variables related with design, production, transportation and other working activities of the engineers in MECAL BV into quality standard system:
      - The rate of CO2 emissions
      - The rate of waste released to water
      - The rate of emitted heat
      - The use of raw materials and natural resources
      - The review of environmental practices of contractors and related suppliers
   b. Relating the performance of the staff exercising proper sustainability actions (especially related with the variables listed in point 3a) with proper incentives.

5.2.2 Corporate Sustainability Strategies for MECAL BV

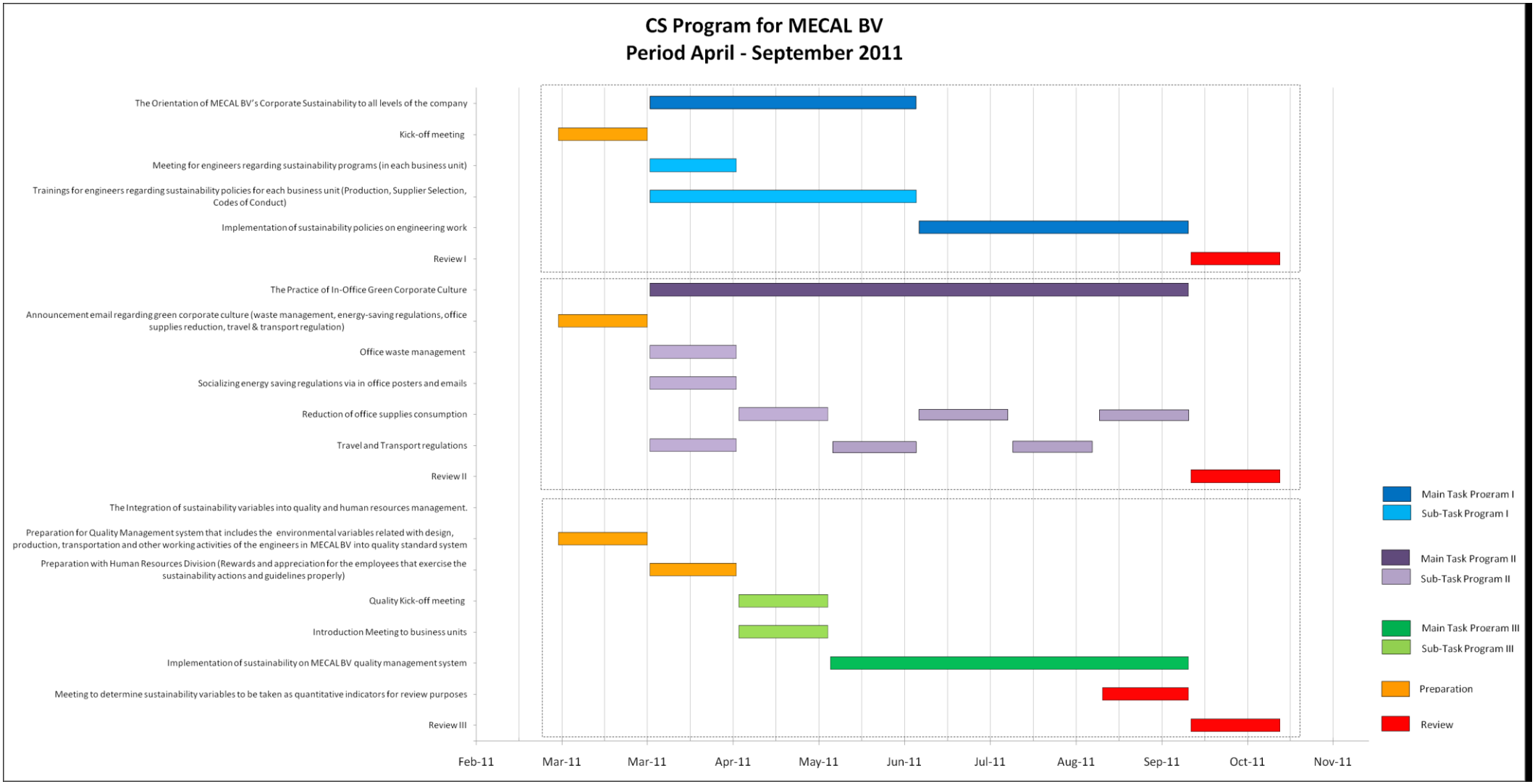
In order to properly implement CS programs, MECAL BV needs to design suitable strategies. Suitable strategies to implement MECAL BV's CS programs are those strategies that are adjusted with the situation in the company and include the program's time schedule, the target participants of MECAL BV's sustainable development and the related stakeholders.

5.2.2.1 Schedule of MECAL BV's Corporate Sustainability

Since CS is new for MECAL BV, the whole company will have to change in order to adapt to the new programs (e.g. change the office habits, change the production procedures, change the design process, etc.). This is a challenge for MECAL BV because some staff will inevitably resist changing from something they have been accustomed to. However, change is a process in which timing is everything. With a proper timing, a successful implementation of a program is possible. Therefore, MECAL BV has to determine an appropriate schedule for its CS' implementation.

Even though there is an urgency to be sustainable according to the results of the SWOT analysis (See section 4.1.1) and sustainability drivers (See Section 4.1.3), it is wise for MECAL BV not to push the staff too hard and excessively fast. Setting the deadline of the first implementation of CS programs to two quarters (i.e. six months) is perceived sufficient as it retains the required sense of urgency while providing room for the staff to adapt to the programs. It is strongly advised to appoint a person as a 'chief whip'. The 'chief whip' is the specially-appointed person that is responsible for starting the process. This person should support and report directly to the managing director.

Thus, based on the CS programs of MECAL BV are set previously (See Section 5.2.1), the implementation schedule is set in Figure 13.



Source: Self-constructed

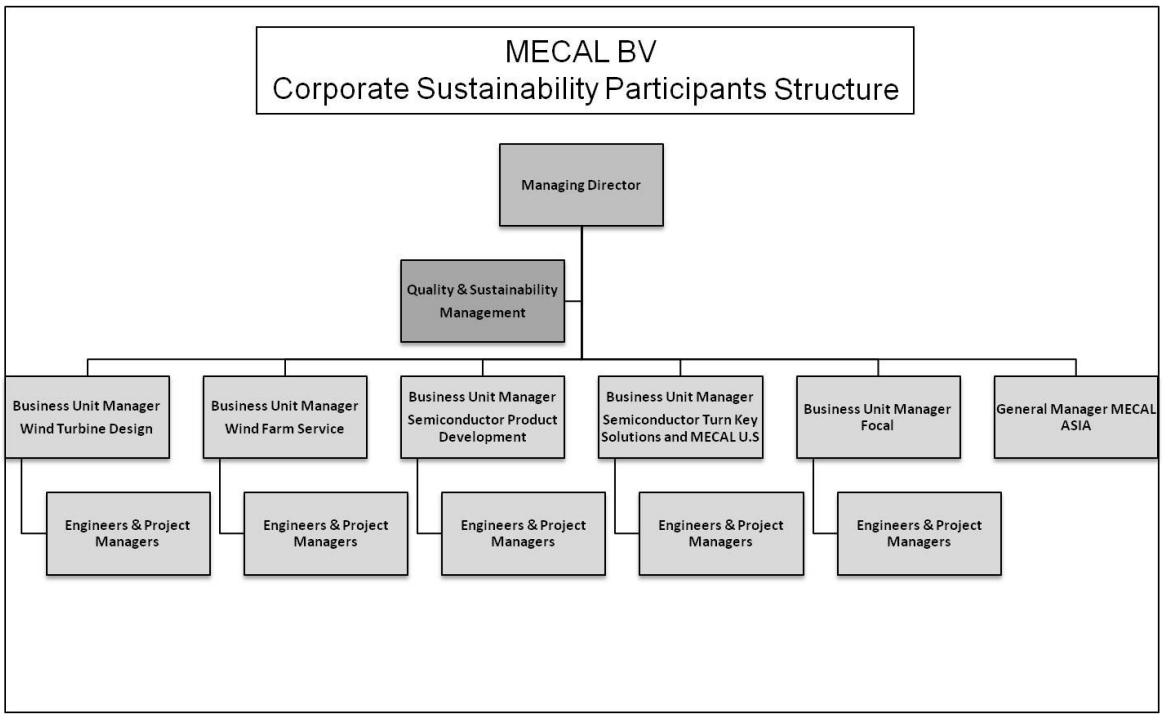
Fig. 13 Schedule for MECAL BV's CS Programs

MECAL BV's implementation of CS programs should start with an orientation of CS programs to all levels in the company, including a companywide announcement regarding the practice and policies of a green corporate culture in the office. These two programs are advised to be firstly implemented with the objective of creating a sense of urgency towards sustainable development in the company and assisting with staff familiarization with the new programs. The third program of integrating sustainability variables into quality and human resources management is started in the third month considering the following two factors. The first consideration factor is that because MECAL BV needs to make sure first that the staff, especially the engineers, understand CS and its purposes of implementation. The second factor to be considered is that MECAL BV needs to be careful in designing proper incentives for the staff. The process of integrating the incentives into the sustainability performance of the staff is not a straightforward effort and can take some time.

A review meeting should be held after the period of two quarters (six months) in order to review the performances of the starter CS programs and to determine possible improvements that can be performed for the next period. As this first implementation of MECAL BV's CS programs can be perceived as a trial implementation, MECAL BV needs to review its performance in order to improve future programs.

5.2.2.2 Participants of MECAL BV's Corporate Sustainability

MECAL BV is an engineering company of which most staffs are engineers and almost all of the management activities are conducted in a centralized manner at the corporate level. This means that the implementation of CS in MECAL BV needs to be centralized and managed through a top-down process from the corporate level to business unit level and subsidiaries. When the CS program is successfully implemented throughout the company, the CS management can be shifted to a decentralized approach and managed at a business unit level. This structure of all the participants of MECAL BV's CS programs is depicted in Figure 14.



Source: Self-constructed

Fig. 14 MECAL BV CS Participants Structure

Based on the results of the sustainability assessment (see Section 4.3), sustainability principles need to be integrated in two main activities: engineers working on projects and direct contacts with customers. Therefore, there are two major target participants for MECAL BV's CS that are crucial to achieve the sustainability goals: the engineers and business unit managers. However, the implementation of CS needs to be supported by other crucial positions in the company such as the executive management, the quality and sustainability management team as well as the project managers in each business unit. As such, the five important participants for the sustainable development of MECAL BV:

- Managing Director of MECAL BV
  As the leader of the company, the managing director should exercise strong authority to lead the whole company toward sustainable development. A good sense of leadership of the managing director is needed to encourage the implementation of MECAL BV's CS because only a persistent leader has the ability to foster the alignment between company's environmental and social efforts with the company's objectives and uphold the progress within the business units' level (cf. Epstein, 2008)
- Quality and Sustainability management team
  A specialized management team should be responsible for the implementation of CS of MECAL BV. As for MECAL BV, it needs to integrate the sustainability initiatives with the quality management team because quality improvement is part of the company's sustainability aspects (See Figure 12 MECAL BV House of Sustainability). As such, there are two main roles for the Quality & Sustainability management team. The first role is to lead and guide the staff toward the specified actions that have already been designed to achieve the sustainability goals. The second role is to conduct the sustainability performance monitoring and measurement.

- Business Unit Managers
  The business unit managers are responsible for procedural activities involving direct contact with customers and business partners (e.g. project order, negotiation, discussion, contract dealing, etc.). Therefore, all the business unit managers of MECAL BV's wind turbine design, wind farm services, semiconductor product development, semiconductor turnkey solutions, and focal vision inspection have to participate in the implementation of the CS. The role of business unit managers is to foster the achievement of sustainable partnerships and viable business goals of MECAL BV's CS.
- Project Managers
  The project managers in each business unit are important to assist the Quality and Sustainability team to implement the CS program to all engineers employed by MECAL BV. The project managers have direct access to review and improve the sustainability performance of the engineers. The project managers can help the quality and sustainability management to regularly review the engineers' performance toward the set of variables that set in the CS programs for MECAL BV (See Section 5.1.2 no. 3a).
- Engineers
  The engineers have broad technical knowledge on producing environmental-friendly designs and productions system to accomplish the goal of protecting the environment. The engineers participating in the implementation of MECAL BV's CS are all engineers in MECAL BV's wind turbine design, wind farm services, semiconductor product development, semiconductor turnkey solutions, and focal vision inspection.

According to the schedule of CS programs implementation of MECAL BV depicted in Figure 13, MECAL BV needs to set its programs participants as follows:

Table 8 List of CS Programs Participants of MECAL BV

No	Programs	Participants / PIC
I	**The Orientation of MECAL BV's Corporate Sustainability to all levels of the company**	
	Kick-off meeting	Shareholders, Executive management, Q&S management team, business unit managers
	Meeting for engineers regarding sustainability programs (in each business unit)	Business unit manager and staff in each business unit
	Trainings for engineers regarding sustainability policies for each business unit (Production, Supplier Selection, Codes of Conduct)	Q&S Management and engineers
	Implementation of sustainability policies on engineering work	Project managers and Engineers in each business unit
	Review I	
II	**The Practice of In-Office Green Corporate Culture**	
	Announcement email regarding green corporate culture (waste management, energy-saving regulations, office supplies reduction, travel & transport regulation)	All executive management, staff, engineers, and shareholders
	Office waste management	Q&S Management and Facilities
	Socializing energy saving regulations via in office posters and emails	Q&S Management
	Reduction of office supplies consumption	Q&S Management and Facilities
	Travel and Transport regulations	Q&S Management and Business Units
	Review II	
III	**The Integration of sustainability principles into quality and human resources management.**	
	Preparation for Quality Management system that includes the environmental variables related with design, production, transportation and other working activities of the engineers in MECAL BV into quality standard system	Q&S Management
	Preparation with Human Resources Division (Rewards and appreciation for the staff that exercise the sustainability actions and guidelines properly)	Q&S Management and Human Resources Management
	Quality Kick-off meeting	Shareholders, Executive Management, Q&S Management
	Introduction Meeting to business units	Q&S Management and Business Units
	Implementation of sustainability on MECAL BV quality management system	All business unit- project managers and engineers
	Meeting to determine sustainability variables to be taken as quantitative indicators for review purposes	Q&S Management and Project Managers
	Review III	

Source: Self-constructed

5.2.2.3 Stakeholders of MECAL BV's Corporate Sustainability

The target audiences of MECAL BV's CS are the company's stakeholders. In developing a CS, it is important to acknowledge the stakeholders that are affected by the CS programs. Based on the interviews with business unit managers (See Appendix 6), stakeholders of MECAL BV are:

- Staff,
- Business partners and suppliers
- Customers (public and private sectors),
- Investors and Shareholders,
- Governments in each country where MECAL BV operates and
- Surrounding societies

The reaction from these stakeholders towards the CS is important to be considered and to be used as feedback on managerial decision-making processes. A clear and common understanding among stakeholders is important to be achieved in order to successfully implement CS programs (cf. Epstein, 2008; Singh et al., 2009).

5.2.3 Corporate Sustainability Performance Monitoring System for MECAL BV

CS programs of MECAL BV are implemented as the company's strategy to conduct a perpetual and responsible business. Hence, it is important to acknowledge performances of the strategy by reviewing its effectiveness toward the goals set at the planning phase. A proper management system is needed to support the performance of the company's sustainable development as it relates to sanctions, motivation and regulations for the employees involved in the programs.

In order to control the performance of CS implementation, the company needs to design a proper performance monitoring system that includes relevant performance indicators. A sustainability monitoring system facilitates the assessment process of the company's sustainability performance and guides the managers to improve the sustainability level of the company. Epstein (2008) argues that how well the sustainability programs are contributing to the corporate value could be examined by measuring the performance using suitable indicators. These sustainability indicators are perceived as the variables that have to be monitored in the performance measurement system, and they will be measured annually.

Thus, according to the sustainability goals of MECAL BV, the following sustainability indicators MECAL BV has to review and report every year are listed in Table 9.

Table 9 The Sustainability Indicators of MECAL BV

Sustainability Goals	Indicators
Sustainable Relationships	• The numbers of suppliers, partners, and customers that initiate sustainability actions or programs / year • Frequency of employee turnover / year • The number of event or fair participation / year • The number of injuries during engineers working on the project/ year
Environmental Protection	• The amount of CO2 Emission from production / year • The energy consumption from the office activities / year • Office paper supplies / year • The use of raw materials and natural resources / year
Viable business	• Business profits/ year • The company operation costs/ year • Shareholders' value / year

Source: Self-constructed

For each of this indicator, specific goals have to be set in advance. The sustainability indicators are designed to provide early warning information to prevent economic, social and environmental damage; to guide in formulating strategies and communicating ideas; and to support the decision-making process (Singh et al., 2009). To be clear, these sustainability indicators are accumulated sustainability performances that MECAL BV has to report and review annually based on the CS programs that are implemented.

5.3 Monitoring and Reporting

The implementation of the CS program of MECAL BV can be smoother when there is an appropriate monitoring and reporting procedures to support it. An appropriate monitoring and reporting procedures facilitates the performance monitoring activities that would ensure that the implementation of the programs is aligned with the initial plan and objectives. The sustainability performance monitoring system for MECAL BV is designed in the most applicable way that would fit all of the different operations of business units.

For MECAL BV, monitoring activities have to be performed continuously throughout the year. As for the monitoring procedures, it is advised that project managers and business unit managers report performances of the sustainability actions of engineers and employees in each business unit to the Quality and Sustainability management team every two quarters. Meanwhile, the Quality and Sustainability management team are obliged to monitor the processes and performances of CS implementation throughout the year.

In case of reporting, there are two types of report that the Quality and Sustainability management has to prepare. The first one is the CS programs report that is submitted to the managing director of MECAL BV every six months. The second one is the MECAL BV's Sustainability Report that is developed annually on the basis of the CS programs report. The MECAL BV's Sustainability Report acts as an accumulated CS programs report for all of the CS programs implemented during the year. The report will be made public

in order to ensure transparency in business. In addition, to facilitate the process of receiving feedback from the stakeholders, a sustainability questionnaire form should be formulated and distributed to the stakeholders. The feedback from the stakeholders should be utilized to enhance the performance of sustainable development of MECAL BV.

5.4 Supporting Activity: Communication of MECAL BV's Corporate Sustainability

Since the implementation of the CS of MECAL BV is an ongoing process, the company needs to carry out supporting activities to maximize sustainability efforts and ensure the achievement of the sustainability goals, such as promoting its actions to surrounding societies. MECAL BV initiates the CS process with the motivation of fulfilling the requirements of its business partners and as responsibility to society regarding ethical business practices. Therefore, it is important to publicly communicate this intention of sustaining the planet and the people living on it. In this vein, MECAL BV is advised to communicate and promote its CS intentions to the external stakeholders of the company. The external stakeholders of MECAL BV are the suppliers, business partners, customers and surrounding communities.

There are two possible ways of communicating the program to the external stakeholders. The first communication strategy is a direct one, in which the responsible managers directly communicate and apply the related policies to the suppliers, or the business partners, when they conduct business together. The second way is by indirectly communicating the CS of MECAL BV through promotion activities and marketing materials of the company. According to the analysis in the service blueprints, the most effective way to communicate the CS program is by integrating the information of the program via the media for customer contact, such as the company website, business cards and promotional banners of the company. In addition, publishing separate brochures or marketing materials about the CS of MECAL BV will enhance its corporate image since marketing materials are available for public consumption, not only for the business partners or customers.

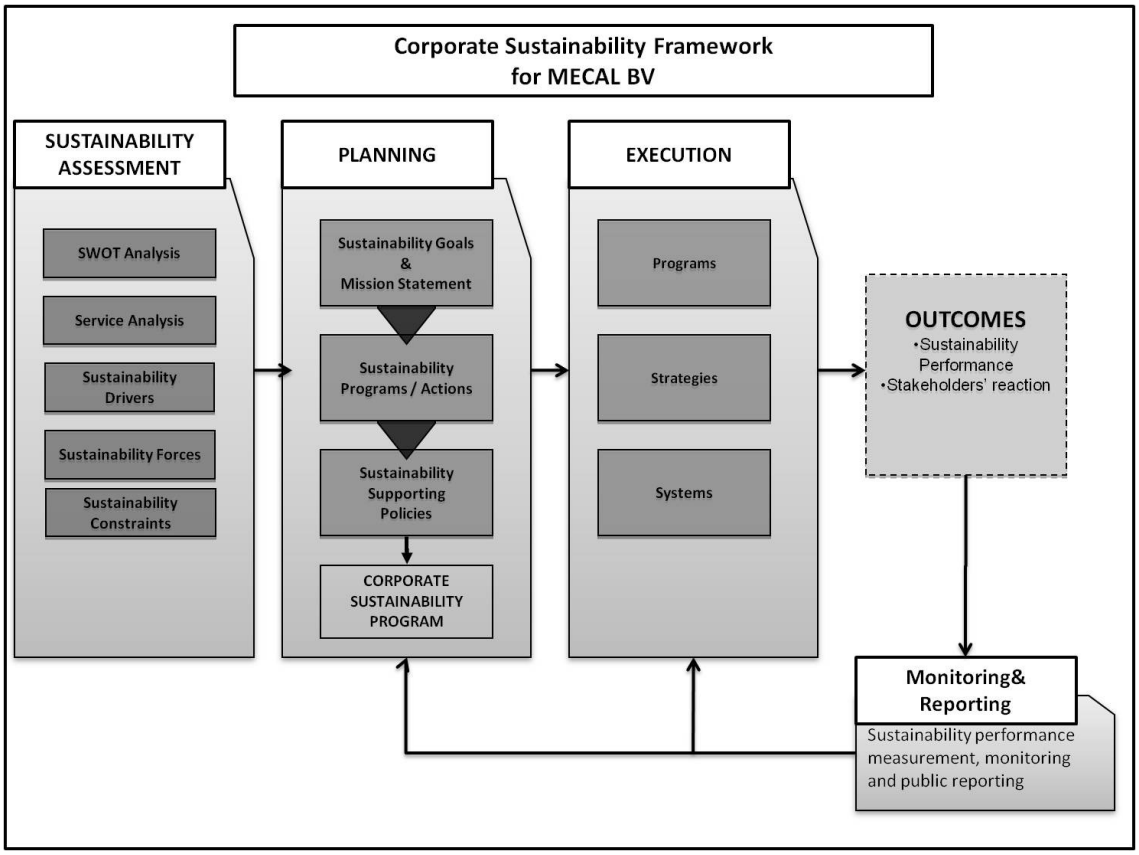
Communicating the CS of MECAL BV to all stakeholders of the company reflects the responsible attitude of embracing transparency and responsible business practices that improve the corporate image and reputation. Corporate communication is part of the process of forming the corporate identity and reputation that enhances competitive advantage (Balmer and Gray, 1999). The corporate reputation and image also indirectly attract a quality workforce to generate another competitive advantage for the company. The company can take advantage of a qualified workforce when they can develop this workforce as uniquely skilled and difficult-to-be-imitated by the competitors (Greening and Turban, 2000).

A proper communication of the CS program supports the integration of the sustainability principles into the working process of the engineers, enhances the company competitive advantage by improving the corporate image and reputation and attracts qualified employees that would benefit the company in the future.

5.5 Sustainable Development Framework for MECAL BV as an International Engineering Service-Based Company

Implementing the new programs with a set of actions for all business units within MECAL BV is a challenging task. The company needs to implement a suitable framework that is well adjusted with strategies, needs and circumstances of the company. A proper CS framework is useful to guide the implementation of CS initiatives of an international engineering service.

The framework to develop a feasible, suitable and acceptable CS program for MECAL BV is shown in Figure 15 below.



Source: Self-constructed

Fig. 15 Corporate sustainability framework for international engineering service company

Based on the research performed in MECAL BV, the first step in a sustainable development in an engineering service company is not the planning activity as what has been proposed by many scholars. Since implementing CS is somehow a new strategy for the company, the first step is to conduct preceding activities to ensure that the company has sufficient resources as well as capabilities and is feasible to conduct a sustainability initiative. The research in MECAL BV introduces these preliminary processes of sustainable development defined as a process of sustainability assessment (See Chapter 4). This phase consists of assessments of the company's internal, external, and business contexts regarding

the aspects of sustainability. There are five major aspects of a company that should be assessed in this sustainability assessment:

1. The company's strengths, weaknesses, opportunities and threats
2. The service processes
3. The sustainability drivers
4. The sustainability forces
5. The sustainability constraints

After the analysis in the sustainability assessment step showing that the company is feasible to conduct sustainability initiatives, the planning step can be initiated.

The planning step is the step in which MECAL BV formulates its sustainability principles by defining its sustainability goals, setting up the sustainability action guidelines, and formulating several policies that will foster the implementation of the CS programs of MECAL BV.

Afterwards, the sustainable development is continued with the execution step. The execution step is the step to formulate the CS programs for the company. In this step, the CS programs are formulated based on the results obtained in the sustainability assessment and aligned with the sustainability principles of MECAL BV that are set in the planning step. To support the implementation of these programs, suitable strategies and system have to be determined. The strategies include setting up a structure of target participants, the stakeholders, and programs implementation schedule. In addition, a proper performance monitoring and reporting system and procedures are designed in this step to ensure that the implementation of CS programs of MECAL BV runs aligned with the sustainability principles of the company. The involvement of the MECAL BV executive management in each activity is crucial in order to develop a suitable program that is acceptable for the company.

As the execution of MECAL BV's CS programs is an ongoing process, it is advised that MECAL BV carries out other activities that can foster the effectiveness of the programs and the company's competitive advantage. The activities that can cultivate CS programs' effectiveness are promotion and communication. The CS programs of MECAL BV should be well promoted through the marketing materials such as CS brochures, the corporate website, etc. Meanwhile, new policies on sustainable partnership and production have to be clearly communicated related to business partners and suppliers. By promoting and communicating the CS programs, MECAL BV may gain maximum benefit from its sustainable development.

6. Conclusions and Recommendations

Companies nowadays are becoming increasingly aware of negative impacts created by their business operations. Therefore, formulating a proper strategy in order to balance the companies' business performances with their impact on the environment and surrounding society has become an interest for both business practitioners and academic communities. In this research, Corporate Sustainability (CS) is introduced as the company's strategy to conduct a perpetual and responsible business by aligning the company's objectives with three performance criteria of financial, social and environmental. CS is perceived as a concept designed to facilitate companies in performing a balanced business, which means that it is to ensure companies conduct responsible business activities while still maintaining profits. However, there are no general solutions to implement CS for a company. As such, even though there are many available CS frameworks that can be adopted, companies still need to come up with custom-made CS strategies that are matched with their objectives and capabilities. This research seeks to give insight on what factors need to be considered during the implementation process of CS strategies.

This research is carried out for two purposes. First, it is performed for the scientific purpose of exploring the applicability of existing theories related to CS frameworks and formulating a framework that can be utilized to develop feasible, suitable and acceptable CS programs for an engineering service company. Second, this research is conducted to provide a better understanding for the managerial practice of CS formulation, especially in the area of engineering service companies. For this purpose, it is performed to develop suitable CS programs for MECAL BV (an international engineering service company based in Enschede, the Netherlands) as part of its customers' demand (e.g. IBM) as well as to foster its competitiveness. Hence, this research is conducted in a deductive manner, in which existing theories related to a CS framework are applied to test their suitability for an engineering service company. Several modifications and additions occur in the process in accordance to the situation, needs and objectives of the company.

There are two main results that are produced by this research. The first result is a framework to develop a feasible, suitable and acceptable CS programs for an engineering service company such as MECAL BV. The second result is the recommendations for sustainable development of MECAL BV, including the competitive sources of the company that are benefited from the CS programs' implementation.

The case study of MECAL BV results in a CS framework for an international engineering service-based company that consists of four main activities:

1. Sustainability Assessment

   The collected data are processed and analyzed in a sustainability assessment process of a company. Sustainability assessment is a preceding step before planning a sustainable development to determine the feasibility of a company in implementing a sustainable development program. Comprehensive analyses of both internal and external aspects of the company, including a SWOT analysis, a service analysis and an analysis of sustainability drivers, forces and constraints, are involved in this step. The main goal of this sustainability

assessment is to ensure whether the company has sufficient resources and capabilities as well as potential opportunities to conduct a sustainable development.

2. Planning
   The planning includes formulation of the sustainability principles that will be the standard when the program will be implemented. The sustainability principles are the company's sustainability goals and mission statement, sustainability action guidelines and sustainability policies.
3. Execution
   The execution starts by setting up the CS programs that are suitable with the company's sustainability principles. In addition, suitable sustainability strategies, the structure and the system that are required to successfully implement the program are determined.
4. Monitoring and Reporting
   Monitoring activities are needed to ensure that the implementation of CS is aligned with the planning. Public reporting is crucial to facilitate easier feedback from the stakeholders and to and perform transparent business.

6.1 Contributions

This case study research on MECAL BV aims to fill the gap in the recent literature of CS, by introducing a CS framework and providing a better understanding into areas that have only been given little attention (i.e. service-based companies, especially in engineering industries). There are two major contributions from this research that can contribute to the existing academic literature.

The first contribution is the CS framework. As most studies elaborate on the general framework of planning, execution and monitoring processes of a sustainable development, this research introduces a more comprehensive planning step that includes a complementary step that is crucial for sustainability development in an international engineering service company. This step is the comprehensive sustainability assessment process before planning the sustainable development. The sustainability assessment is perceived to be comprehensive as it considers three aspects:

- The first aspect is that the company is categorized as a service company, meaning that this company mostly produces intangible products and an additional analytical tool is needed to analyze the services.
- The second aspect is that the company operates in engineering business, involves engineers and needs a different approach to implement the CS program.
- The third aspect is that the company has to comply with specific local requirements as it operates internationally.

The three aspects covered in the sustainability assessment step can be processed through a SWOT analysis, a service blueprint analysis and specified matrixes that are developed to process the company's data based on its financial, social and environmental aspects and to consider the international dimensions of the company. As for the results, a sustainability assessment provides decision-making considerations towards the feasibility of the company to initiate sustainable development. Moreover through those analyses, a sustainability assessment produces sustainability drivers, forces and

constraints that are essential to plan the sustainability development of a company. Therefore, complementing the existing theory from recent literature, the sustainability for an engineering service company contains four major activities: sustainability assessment, planning, execution and performance monitoring.

The second contribution made by this research is that a service blueprint analysis can support the theory proposed by Cruickshank and Fenner (2007). According to these scholars, engineers need clear guidelines to successfully implement the sustainable development in their daily activities. The analysis made from the service blueprints shows that one of the major processes that is feasible to be integrated by the sustainability principles is the process in which engineers work on projects. This leads to the development of supporting policies needed to achieve the sustainability goals of the company. As such, implementing an analytical tool as a service blueprint provides deeper understanding of the theory proposed by those authors. Furthermore, a service blueprint is also useful to discover the processes in which competitive advantages can be achieved.

6.2 Problems and Suggestions for Future Research

The difficulties in this research mostly related to the process of data collection. It would have been mandatory that the company's executive management communicated the program to the entire company properly. A shared perspective towards the company's future direction is crucial to successfully implement the company's program.

Finally, although it sheds new light on factors to be considered in developing a corporate sustainability framework, this study has limitations that can only be overcome by further research. It has to be mentioned that this research was limited to a service-based company. While the findings of this research might be applicable to other company types, precise research should be undertaken to demonstrate the applicability of the concepts proposed. Future research in this area could aim at the implementation of the framework in form of empirical studies for different company types.

6.3 Recommendations for MECAL BV

By directly involving the company in each step of the process, CS programs for MECAL BV are produced as follows:

1. Sustainability Assessment
   In this research, the sustainability assessment of MECAL BV confirms that it is feasible for MECAL BV to implement sustainable development. In responding to the opportunities to sustain the relationships with the customers and to sustain the businesses in the company, MECAL BV has sufficient resources and capabilities. MECAL BV has sufficient resources and capabilities to perform sustainable development. MECAL BV has sufficient resources as MECAL BV has more than 50 engineers with broad engineering knowledge, has been operating in the renewable energy industry and has 20 years of experiences in harmless business of providing engineering

consultancy services and has close relationships with major key players in worldwide markets (e.g. IBM, Samsung, ASML, Vestas, Hitachi, etc.). In addition, as MECAL BV provides consultancies for its customers, the company is perceived to have the capabilities to sustain the company as well as the customers' businesses, to persuade the customers towards sustainability actions and to integrate sustainability principles into the works that are delivered to the customers. MECAL BV also has the capability to survive and promptly improve its performances towards the macro financial situation of the world's economic crisis in recent years. However, it is prudent for MECAL BV to develop sustainability programs and strategies that can actualize its internal drivers, match its external forces and comply with its global constraints. As it is feasible to implement sustainable development, MECAL BV shall proceed with the sustainable development process.

2. Planning

   Planning is the step in which MECAL BV determines its sustainability principles. The sustainability principles include sustainability goals and mission statement, sustainability actions guidelines and related policies that act as standards or basic principles of the company's sustainability initiatives.

   MECAL BV's sustainability goals and mission statement are formulated based on the results obtained from assessing MECAL BV's sustainability drivers. As such, MECAL BV needs to establish its sustainability goals as:

   - Sustainable relationships
   - Environmental protection
   - Viable business

   Based on these goals, the mission statement for MECAL BV should read:

   "*It is our mission to achieve a sustainable living for the small planet that we live in by conducting responsible engineering practices. We sustain relationships with partners that also embrace ethical business practices, we endeavor to help protect the earth by implementing responsible production processes and wise material selection and we foster our economic performance through a greener corporate culture.*"

   After the sustainability goals and mission statement are formulated, this planning step is continued by defining a set of guidelines for sustainability actions to be designed in such a way that they are matched with the sustainability forces and constraints that can support the achievement of those goals. The sustainability action guidelines for MECAL BV are set to guide the company's actions towards sustainability to be aligned with the sustainability goals.

   In addition, relevant supporting policies are formulated as these will facilitate engineers to easily integrate sustainability principles into their daily activities and will also support the achievement of the company's sustainability goals. Based on the analyses from this research, the three most suitable policies that can be adopted by MECAL BV are:

   - Production Policy
   - Procurement / Supplier Selection Policy

- Business Codes of Conduct

3. Execution

After all elements of the sustainability principles of MECAL BV are determined in the planning step, execution of the sustainable development at MECAL BV begins by determining specific programs that MECAL BV has to pursue in order to achieve the sustainability goals. CS programs for MECAL BV are:

1. The Orientation of MECAL BV's Corporate Sustainability to all levels of the company.
2. The Practice of In-Office Green Corporate Culture.
3. The Integration of the sustainability principles into a quality management system and human resources management:
    a. To include the environmental variables related with design, production, transportation and other working activities of the engineers in MECAL BV into a quality standard system (i.e. rate of CO2 emissions, rate of waste released to water, rate of emitted heat, the use of raw materials and natural resources and the review of environmental practices of contractors and related suppliers)
    b. To relate the performance of the staff exercising proper sustainability actions (especially related with the variables listed in point 3a) with appropriate incentives.

After the CS programs are determined, the execution of MECAL BV's sustainable development is continued by formulating suitable strategies and system. The suitable sustainability strategies for MECAL BV include CS' implementation schedule and involved parties that are classified as CS participants and stakeholders.

It is mandatory for MECAL BV to start with programs that can facilitate a sense of urgency towards sustainable development to all staff in the company. As such, the orientation of CS programs to all levels in the company, including a company-wide announcement regarding the practice and policies of a green corporate culture in the office, are the ones to be firstly implemented. Following this, the program of integrating sustainability variables into quality and human resources management shall be started.

This research defines five target participants for a sustainable development of MECAL BV:

- The Managing Director of MECAL BV. He needs strong authority to lead the whole company toward sustainable development. A good sense of leadership of the managing director will encourage the implementation of MECAL BV's CS.
- A Quality and Sustainability management team. This is a specialized management team responsible for the implementation of CS of MECAL BV. There are two main roles for the Quality & Sustainability management team. The first role is to lead and to guide the staff toward the specified actions that have already been designed to achieve the

sustainability goals. The second role is to conduct the sustainability performance monitoring and measurement.

- The Business Unit Managers of MECAL BV. They are responsible for procedural activities that involve direct contact with customers and business partners (e.g. project order, negotiation, discussion, contract dealing, etc.).
- The Project Managers within all of the business units in MECAL BV. They can assist the Quality and Sustainability team to implement the CS program to all engineers employed by MECAL BV because they have direct access to review and improve the sustainability performance of the engineers.
- The engineers of all business units in MECAL BV. They have broad technical knowledge on producing environmental-friendly designs and production systems to accomplish the goal of protecting the environment.

In addition, by analyzing the results from the interviews with business unit managers the stakeholders of MECAL BV related with its sustainability initiatives are:

- Staff
- Business partners and suppliers
- Customers (public and private sectors)
- Investors and Shareholders
- Governments in each country where MECAL BV operates
- Surrounding societies

Without a suitable performance monitoring system, determining the CS programs' schedule, its target participants and audiences are not sufficient to properly execute or implement MECAL BV's CS programs. Therefore, MECAL BV's Quality and Sustainability management team has to review the overall sustainability performances of the company based on MECAL BV's sustainability indicators that integrated in the company's sustainability performance monitoring system. The sustainability indicators of MECAL BV are determined based on the company's sustainability goals.

4. Monitoring and Reporting

After the sustainable development is executed, MECAL BV needs to design suitable procedures to monitor and report its sustainability activities. This research suggests MECAL BV to perform its sustainability monitoring activities continually throughout the year. The project managers and business unit managers report performances of the sustainability actions of engineers and employees in each business unit to the Quality and Sustainability management team every two quarters parallel with the implementation of CS programs.

For MECAL BV, it is recommended that the Quality and Sustainability management team has to prepare two types of report:

1. MECAL BV's CS Programs Report to be submitted to the managing director of MECAL BV every six months. The report is developed to facilitate faster improvement to be applied in the next CS programs with the objective that MECAL BV can enhance its sustainability performances in the end of the year.
2. MECAL BV's Sustainability Report to be developed annually and based on the CS programs report. This report acts as a summary of the accumulated reports for all of the CS programs implemented during the past year. The report will be made public in order to ensure transparency in business.

In addition, to enhance the effectiveness of the company's CS programs, MECAL BV needs to promote and communicate its intention of performing a sustainable business externally. The communication can be performed through:

- Direct communication to suppliers, customers, and business partners regarding the new CS program of MECAL BV. This strategy is perceived to be beneficial as this fosters the achievement of MECAL BV's sustainability goal of performing sustainable relationship with sustainable partners.
- Indirect communication through marketing materials. By integrating MECAL BV's initiative to conduct a sustainable business in its marketing materials, the company's reputation can be enhanced.

Aside from determining a framework to develop CS programs for MECAL BV, this research also successfully determines the sources to foster the company's competitiveness by performing the sustainable development. MECAL BV can improve its competitiveness by following these aspects:

1. Integrating financial costs reduction planning with the program of CS (e.g. reduce the transportation allowance, reduce the office supplies consumption, energy-saving in the office, etc.).
2. Adjusting and adopting the strategies of the business partners and customers.
3. Conducting supporting marketing activities for the new CS program to improve corporate image and reputation, as well as to increase the interest of a qualified workforce.

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Appendix 1. CS Interview Form for Business Unit Managers

Respondent Name : _____

Position in MecalB.V : _____

Date and Time : _____

Location : _____

I. Questions Regarding General Business Information

1. There are x people employed under your unit, can you explain the basic activities? And where are those activities mostly carried?

   _____

2. Can you explain briefly about the services provided by your business unit and its process?

   _____

3. Who are the people/parties internally and externally related with your business operation?

   _____

4. Can you specify some requirements or rules regarding the international position that affecting your business operation?

   _____

5. Who is your target market? Can you briefly explain the significant characteristics of each of them?

   _____

6. In your point of view, please determine the strength of the business you manage and the opportunities you might conquer with those strengths.

   _____

7. List 5 issues that considered important in your business operation and please explain the reasons.

_____

II. Questions Regarding Sustainability

1. Are you familiar with the term “Corporate Sustainability”? If so, what does it mean for you?

   _____

2. Within your business operation, which aspect that mostly affected?

   _____

3. Do you think sustainable development is important to improve your business performance? Why?

   _____

4. In your own words, how can a business defined as a sustainable one?

   _____

III. Questions Regarding Environmental Protection

1. In what extent your business affecting the environment? How do you take precaution to minimize that?

   _____

2. Do you understand the environment impacts likely to be faced by your business partners or customers? Are there product and service opportunities available to overcome these impacts?

   _____

3. Please list 5 natural resources related with your business operation and 5 resources being used daily in your office.

   _____

IV. Questions Regarding Social Concerns

1. Do you think social engagement is crucial in your business operation? If so, why?

_____

2. In what aspect of your business might be highly involved in this issue? Please mark on the selected aspect:

	Procurement or Supply Chain
	Conducive Workplaces and Employment Environment
	Equality of Employment Opportunities and Respect of Human Rights
	Social Contribution Activities
	Other. (Please Specify) ……

V. Questions Regarding Financial Performance

1. In what way will the implementation of CS program affect the company profit or loss?

_____

2. Do you think that considering the corporate sustainable development might enhance your company performance? In what aspect of business other than financial will CS affect?

_____

3. If there is any chance of Mecal implementing the CS program, what is your hope or expectation from it?

_____

4. Please write below any other remarks or requests you have regarding the MecalCS initiatives

_____

Appendix 2. The Justifications of Interview Questions

I. General Business Information

Nr.	Question	Justification
1	There are x (depends on the data from the HR) people employed under your unit, can you explain the basic activities? And where are those activities mostly carried?	These are introductory questions to gain general information about the business and the people, place, and activities involved within it.
2	Can you explain briefly about the services provided by your business unit and its process?	
3	Who are the people/parties internally and externally related with your business operation?	It is important to consider the feedback and reaction from the people that directly affected by the policies (the stakeholders) because their feedbacks are valuable for the managers' decision making (Epstein, 2008)
4	Can you specify some requirements or rules regarding the international position that affecting your business operation?	These questions are designed to find out specific requirements and conditions in specific area of business that might affect the business strategy and operation.
5	Who is your target market? Can you briefly explain the significant characteristics of each of them?	
6	In your point of view, please determine the strength of the business you manage and the opportunities you might conquer with those strengths.	The result will be placed in the consideration in designing the CS program and to complete the SWOT analysis before determining the suitable strategies that might be conducted by the company.
7	List 5 issues that considered important in your business operation and please explain the reasons (i.e. supply chain, production cost, etc).	

II. Questions Regarding Sustainability

Nr.	Question	Justification
1	Are you familiar with the term "Corporate Sustainability"? If so, what does it mean for you?	One most important aspect in designing the program is to have the shared definition about it (Singh, et al., 2009) that would facilitate easier strategy development afterwards.
2	Within your business operation, which aspect that mostly affected? (Social or environment?)	This open question should lead to the answer of social or environmental effects of the business operation. The result of will be used as considerations in determining the appropriate program to facilitate the situation in which the business operates.
3	Do you think sustainable development is important to improve your business performance? Why?	The results will be addressed in the recommendations and implementation plan sections.
4	In your own words, how can a business defined as a sustainable one?	

III. Questions Regarding Environmental Protection

Nr.	Question	Justification
1	In what extent your business affecting the environment? How do you take precaution to minimize that?	These will be questioned to find out the respondent's personal concern and knowledge toward the subject and their awareness of environmental protection of the business they operate.
2	Do you understand the environment impacts likely to be faced by your business partners or customers? Are there product and service opportunities available to overcome these impacts?	The results of these questions might be the consideration in aligning the real situation on the field with the process of designing the appropriate CS program that would cover all the businesses run by the company
3	Please list 5 natural resources related with your business operation and 5 resources being used daily in your office.	

IV. Questions Regarding Social Concerns

Nr.	Question	Justification
1	Do you think social engagement is crucial in your business operation? If so, why?	These will be questioned to find out the respondent's personal concern toward the subject and the society.
2	In what aspect of your business might be highly involved in this issue? Please mark on the selected aspect: ☐ Procurement or Supply Chain ☐ Conducive Workplaces and Employment Environment ☐ Equality of Employment Opportunities and Respect of Human Rights ☐ Social Contribution Activities ☐ Other. (Please specify) ……	The results will be addressed in the recommendations and ideas in sustainable development program.

V. Questions Regarding Financial Performance

Nr.	Question	Justification
1	In what way will the implementation of CS program affect the company profit or loss?	York (2009) argued that the company might create competitive advantage by reducing the cost or increasing the revenues. This question will lead to the probability of finding out the possible competitive advantage might be gained by MECAL BV.
2	Do you think that considering the corporate sustainable development might enhance your company performance? In what aspect of business other than financial will CS affect?	The question is both informative and initiative. The purpose is to gain different point of view regarding the effect(s) of implementing the program. By asking this question, the respondent will also be encouraged to implement the program by knowing the informed benefits of doing it

3	If there is any chance of Mecal implementing the CS program, what is your hope or expectation from it?	The results will be addressed in the recommendations and implementation plan sections.
4	Please write below any other remarks or requests you have regarding the MecalCS initiatives	

Appendix 3. The Questionnaires Form for Customers/Business Partners

Dear Respondent,

This questionnaire is part of a research project about CS and its application in business, especially in engineering-based companies. Your responses are essential to enhance my understanding on the subject, build clearer picture of the issues, and improve future development on the subject. Your willingness to cooperate will be much appreciated.

This questionnaire should take you about 15 minutes to complete. Please answer the questions in the spaces provided and feel free to add further comments.

All the information you provide will be treated properly and in the strictest confidence for academicals purpose only and be used as the primary data for my research project in Business Administration study in University of Twente, The Netherlands.

I hope you find completing the questionnaire enjoyable, and thank you for taking time to help me. Please return the completed questionnaire to me, AnisaEsaRiani, before November 5th, 2010. If you have any questions or would like further information, please do not hesitate to contact me by phone +31681305599 or by email anisa.esa@gmail.com.

Thank you for your help.

Kind Regards,

AnisaEsaRiani

MSc. student Business Administration

University of Twente.

CS Interview Form

Company : _____

Respondent Name : _____

Position in the company : _____

Date and Time : _____

Location : _____

1. Defining sustainability is the first critical step in developing a plan for a sustainable product. From your perspective, can you tell me what the definition of a sustainable business is?

   _____

   _____

2. Sustainability is becoming a major growth driver for the company. Does your company apply sustainability program(s)? If so, can you tell me is your company's definition of sustainability and what your company's sustainability program is about?

   _____

   _____

3. Can you explain the dimensions of your company sustainability that are most (or should be) concerned in your business?

   _____

   _____

4. What are the roadblocks or constraints that you see preventing more forward progress of implementing the sustainability program in your business practice?

   _____

   _____

The next questions are designed for the company that applied the sustainability program, or in progress of doing so. If your company has not apply this, please feel free to leave the questions unanswered and send this form back to me to share your idea of a sustainable business practice.

5. Other than applying the program externally for the society and environment, does your company integrate the idea within the company internal operation (i.e. HR management approach, Standard Operation Procedures, Employee Manual, Workplace Safety Policy, Codes of Conduct, corporate culture, etc)?

   _____

   _____

6. Based on your opinion, what are the requirements for a successful CS program, so as to provide real value to the environment and society?

   _____

   _____

7. Do you think that you need sustainable partner(s) to achieve your sustainability goals? Why? Are there any specific requirements or code to comply for your partners or suppliers?

   _____

   _____

8. Do you agree that companies should be completely transparent to public, especially consumers and suppliers regarding their sustainable activity? To what extent?

   _____

   _____

9. Any final thoughts or advice for companies looking to integrate sustainability into their organizations?

   _____

   _____

Appendix 4. Justifications of the Questionnaires to Customers/Business Partners

No	Question	Justification / Purpose
1	Defining sustainability is the first critical step in developing a plan for a sustainable product. From your perspective, can you tell me what the definition of a sustainable business is?	To collect personal opinion regarding the definition of sustainability and its importance in business
2	Sustainability is becoming a major growth driver for the company. Does your company apply sustainability program(s)? If so, can you tell me is your company's definition of sustainability and what your company's sustainability program is about?	The questions are designed to investigate the client or competitor toward related program and the results will be considered as the external analysis before designing the CS program. The purpose is also to discover the sustainability trends within the related industry
3	Can you explain the dimensions of your company sustainability that are most (or should be) concerned in your business?	To enhance the quality of the partnership, MECAL BV needs to know the important aspects that highly considered by the business partner. Furthermore, the information provided by the clients also useful as a benchmark for MECAL BV sustainability initiatives.
4	What are the roadblocks or constraints that you see preventing more forward progress of implementing the sustainability program in your business practice?	
5	Other than applying the program externally for the society and environment, does your company integrate the idea within the company internal operation (i.e. HR management approach, Standard Operation Procedures, Employee Manual, Workplace Safety Policy, Codes of Conduct, corporate culture, etc)?	
6	Based on your opinion, what are the requirements for a successful CS program, so as to provide real value to the environment and society?	Personal perspectives from different companies might enhance the knowledge and ideas for future contribution on the subject.
7	Do you think that you need sustainable partner(s) to achieve your sustainability goals?	It is important to acknowledge the requirements for partnership with potential

	Why? Are there any specific requirements or code to comply for your partners or suppliers?	partners. The sustainability codes from the partners might become encouragement for MECAL BV to properly implement the principles of sustainable business practice.
8	Do you agree that companies should be completely transparent to public, especially consumers and suppliers regarding their sustainable activity? To what extent?	Transparency as one core principle of good governance is crucial to foster the sustainable development (Parigi et al, 2004). This question is design to investigate the transparency level of the partners so therefore MECAL BV able to screen the best companies to be partner with.
9	Any final thoughts or advice for companies looking to integrate sustainability into their organizations?	Additional perspectives on how the CS implemented in the organization will be valuable as contribution for further development of sustainability initiatives.

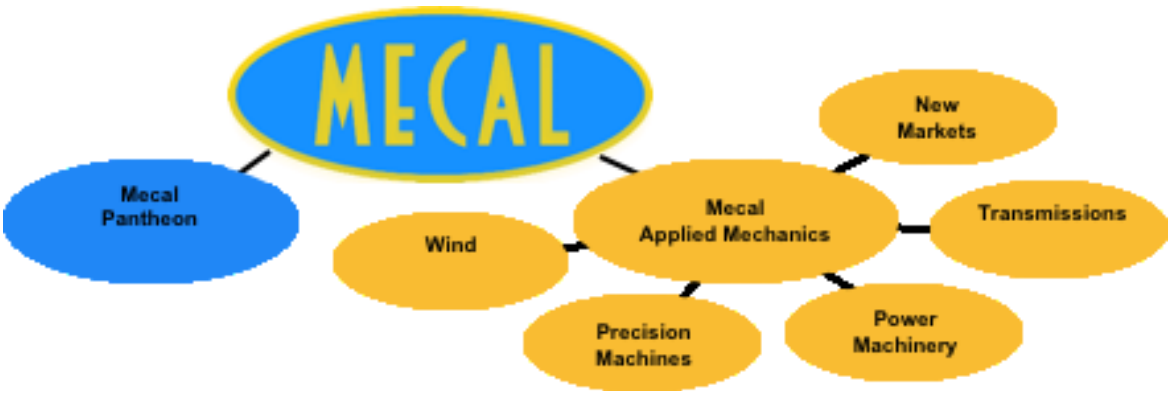
Appendix 5. Overview of MECAL BV

MECAL BV was founded in 1989 by Mr. J. Andringa and the business started as a one-person engineering consultancy office (Eerden, 2007; de Roest and Brughuis, 2004). Then, the company grew to be an incorporated business in 1996 with eight employees in the company (de Roest and Brughuis, ibid). At that time, MECAL BV was providing services regarding mechanical engineering calculations and simulations without any focus on specific markets. In 1996, MECAL BV established a new entity; Pantheon BV focusing on turnkey projects MECAL BV was officially established in 1999. The shareholders of MECAL BV (Huisman, 2010) are:

1. FDKNE Holding BV: 33,3% of the shares.
   This ownership is represented by Mr. J. Andringa.
2. Sibibusi BV: 33.3% of the shares
   This ownership is represented by Mr. A. de Roest.
3. Akabori BV: 33.3% of the shares
   This ownership is represented by F. J. Brughuis

After the company was legally established, Mr. A. de Roest and Mr. F. J. Brughuis were directly involved in the company's operations and grew the company bigger with more offices and more customers, while Mr. J. Andringa remains as a passive shareholder. Mr. A. de Roest directed MECAL BV in the period of 2001 to 2009 and Mr. F. J. Brughuis lead the Advanced Tower System (ATS), which is a joint venture of MECAL BV and two other companies from The Netherlands and Germany that was established in 2005. Since 2009 until now, MECAL BV has been directed by Mr. R. Jungman, while Mr. A. de Roest has been taking responsibilities in the area of business and development of the company.

Following is the classification of MECAL BV's organization based on its product groups that was defined in 2003 (de Roest and Brughuis, 2004).



Source: Business Plan MECAL BV 2005-2010 (2010)

Fig. 16 Mecal BV Organization based on Product Groups (2003)

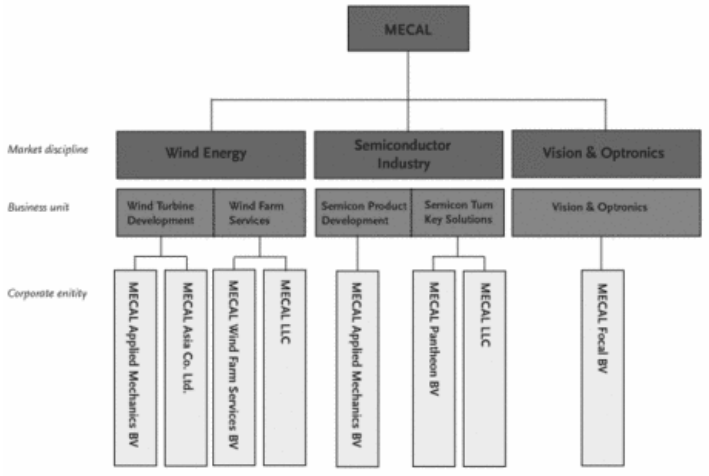
However, in the period 2003 to 2009 MECAL BV continued to grow and decided to leave the markets that are less profitable (Huisman, 2010). In that period, MECAL BV decided to concentrate on specific technology-driven industries (e.g. semiconductor and wind energy) in which mechanical calculations still play the major role and to discontinue the business related to transmissions, power machinery and the exploration of new markets.

In 2006, MECAL BV established a new subsidiary in the United States to expand its markets. The new subsidiary in the United States is MECAL LLC. Then, in 2007, MECAL BV expanded its operation by introducing several new offices in The Netherlands. The offices in The Netherlands are located in Enschede, Eindhoven and Groningen (Eerden, 2007; Huisman, ibid.). MECAL BV is consistently providing (MECAL BV, 2010):

1. Consultancy
   MECAL BV provides consultancies regarding mechanical solutions for the customer's products and processes, such as design, due diligence, operation maintenance, etc.
2. Physical products
   MECAL BV provides semiconductor products in which the company places responsibility for the quality and utility of the results
3. Intellectual property
   MECAL BV turns new ideas and developments into profit by means of license agreements

In 2008, MECAL BV established a new business unit and a new subsidiary as a representative in Asia to expand its existing market (de Roest, 2009; Huisman, 2010). The new business unit that was established in 2008 is Vision and Optronics with MECAL FOCAL BV as the name of the entity. Vision and Optronics business unit was formed to serve the market of visual inspection devices. Meanwhile, the subsidiary was established at the end of 2008 to expand the markets in Asia is MECAL ASIA Ltd.

In 2009, MECAL BV has been operating its business within 10 entities. The organization structure of MECAL BV from 2009 until present is depicted in Figure 17 below.



Source: MECAL BV (2010)

Fig. 17 Organization structure of MECAL BV

MECAL BV is the head of a group of 6 legal entities in which the shares are fully owned by the company and is also participating in 4 other entities with shared ownership (KroeseWevers Audit BV, 2010). The list of the entities of MECAL BV per 2009 is depicted in figure below.

Name	Registered office	Share in issued share capital
		%
Mecal Applied Mechanics BV	Enschede	100,0
Mecal Pantheon BV	Enschede	100,0
Mecal LLC	Virginia (USA)	100,0
Mecal Projects GmbH	Schüttorf (Germany)	100,0
Mecal Facilities BV	Enschede	100,0
Mecal Wind Farm Services BV	Enschede	100,0
Not-consolidated participating interests		
Name	Registered office	Share in issued share capital
		%
Advanced Tower Systems BV	Enschede	43,0
ATS Projekt Grevenbroich GmbH	Grevenbroich (Germany)	25,0
Mecal Focal BV	Enschede	50,0
Mecal Asia KK	Japan	50,0

Source: Annual report of MECAL BV (2009)

Fig. 18 The list of Entities of MECAL BV per 2009

These entities of MECAL BV are managed and classified regarding the market each serves (i.e. wind energy, semiconductor and vision & optronics) (MECAL BV, 2010).

The frequency of employee turnover in MECAL BV is quite low, and the company was getting bigger every year with addition of new employees (i.e. engineers). The details of the number of employees of MECAL BV in the period 2007 to 2011 are listed in the table below.

Table 10 The Numbers of MECAL BV's Employees

	2007	2008	2009	2010 (latest estimation)	2011 (1st estimate budget)
Number of Employees	59	68	77	81	90-100

Source: MECAL BV (2010)

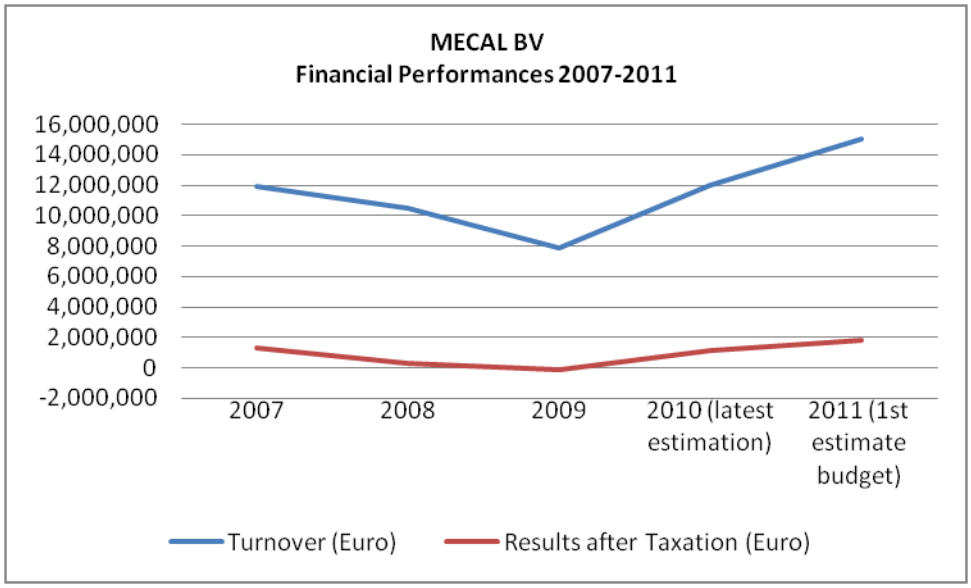
The numbers of employees that are shown in the table above are excluding the number of employees of MECAL Asia Ltd, MECAL FOCAL and ATS since the shares owned by MECAL BV in those entities are not 100%.

Although the company's shares, size and customers were growing, the macro financial situation of the world's economic crisis in recent years affecting the industries had a huge impact on the company's financial performance (de Roest, 2009). However, MECAL BV finally overcame the situation and will gain approximately € 1, 1 million profits after taxes in 2010 (Huisman, 2010). Elaborated below are the financial performances of MECAL BV in the period of 2007 to 2011.

Table 11 Financial Performances of MECAL BV's 2007-2011

	2007	2008	2009	2010 (latest estimation)	2011 (1st estimate budget)	Remarks
Turnover (Euro)	11,900,000	10,500,000	7,900,000	12,000,000	15,000,000	All the numbers are presented on approximate basis
Operating Results (Euro)	1,800,000	600,000	40,000	1,500,000	2.500.000 (before profit share)	
Results after Taxation (Euro)	1,300,000	320,000	-127,000	1,100,000	1,800,000	
Solvency (%)	51.6	66.3	55	50-60%	not known yet	
Investments (Euro)	611000	524000	480000	not known yet	not known yet	

Source: Self-constructed adjusted from KroeseWevers Audit BV (2010); BDO CampsObers Audit & Assurance BV (2009) and information from Huisman (2010)



Source: Self-constructed adjusted from KroeseWevers Audit BV (2010); BDO CampsObers Audit & Assurance BV (2009) and information from Huisman (2010)

Fig. 19 Graphics of financial performance MECAL BV 2007-2011

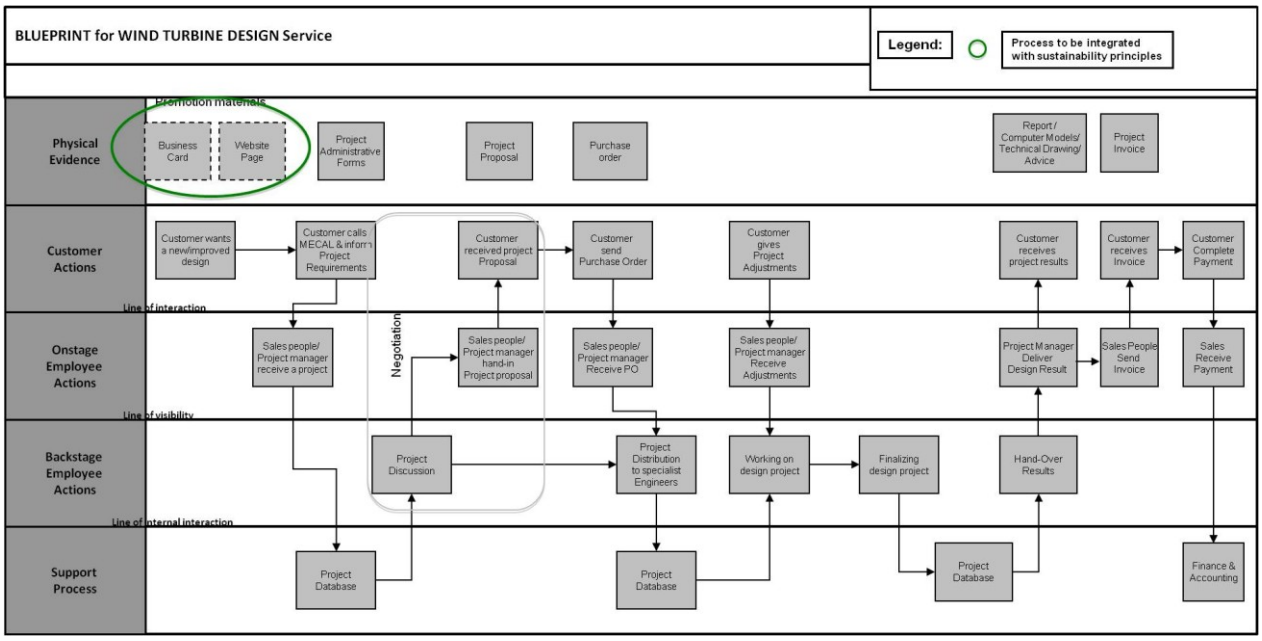
The company was impacted with a loss in 2009 after previously the company profited € 1,316,552 (2007) and € 322,040 (2008) (KroeseWevers Audit BV, 2010) (BDO CampsObers Audit & Assurance BV, 2009). However, MECAL BV was able to promptly improve its performances and achieve big profit in 2010. It is shown by the graphics that MECAL BV is optimistic to continue growing in the upcoming years.

Appendix 6. The Report of the Interview Internal MECAL BV

The respondents of the interview in MECAL BV are as follows. The respondents from Wind Energy business are Mr. Ron Kammeijer (Business Unit Manager of Wind Turbine Design) and Mr. Eric Kamphues (Business Unit Manager of Wind Farm Services). From the Semiconductor sector, Mr. Bernhard Bakker (Business Unit Manager for Semiconductor Development) and Mr. Thomas Dunne (Business Unit Manager of Semiconductor Turnkey Solutions) are the respondents for the interview. The information about Focal Vision and Optronicsis gathered from the interview with Mr. Robert Evers (Operational director). Meanwhile, in order to discover the situation within subsidiary level and outside the European market, Mrs. Aoyun as the General Manager and the representative of MECAL Asia Co. Ltd is the respondent from MECAL ASIA.For the situation of the company's business in The United States, the information resource is Mr. Thomas Dunne. Within the corporate level, the interview is conducted with Mr. Dick van Haare from the management support unit, and Mrs. Gea van Vegchel from the facilities management. In addition, the discussion with Mr. Richard Jungman as the managing director of MECAL BV is also conducted. The information from these respondents will cover the significant issues of the businesses and able to discover the potential values for sustainable development of the company. Followings are the results from the interviews:

1. Business Unit Wind Turbine Design (Mecal Applied Mechanics BV)

There are 22 people employed under the business unit of Wind Turbine Design (Mecal Applied Mechanics BV) in the Wind Energy business of MECAL BV. The fact that the business has been running more than 20 years and has experienced different kind of projects and designs have made MECAL BV trusted to provide consultancy services in technical-related work, such as conceptual design, load simulation & control optimization, certification, mechanical design, and measurement validation in the wind energy industry. The activities of this business unit are mostly executed in MECAL BV head office in Enschede, The Netherlands, or in the client's location. Illustrated below is the service blueprint of Mecal Wind Turbine Design business unit.



Source: Self-constructed

Fig. 20 Service Blueprint of Wind Turbine Design

This business unit has worldwide clients in China, Japan, Korea, Germany, Spain, Denmark, and The United States. As such, being aware of the local regulation of wind turbine in each market are crucial in conducting the business. According to Mr. Ron Kammeijer, since Asia, Europe, and the United States apply different design regulation, the engineers under his supervision are adjusting the design with the local regulation or guidelines for design for local market in which the client operates.

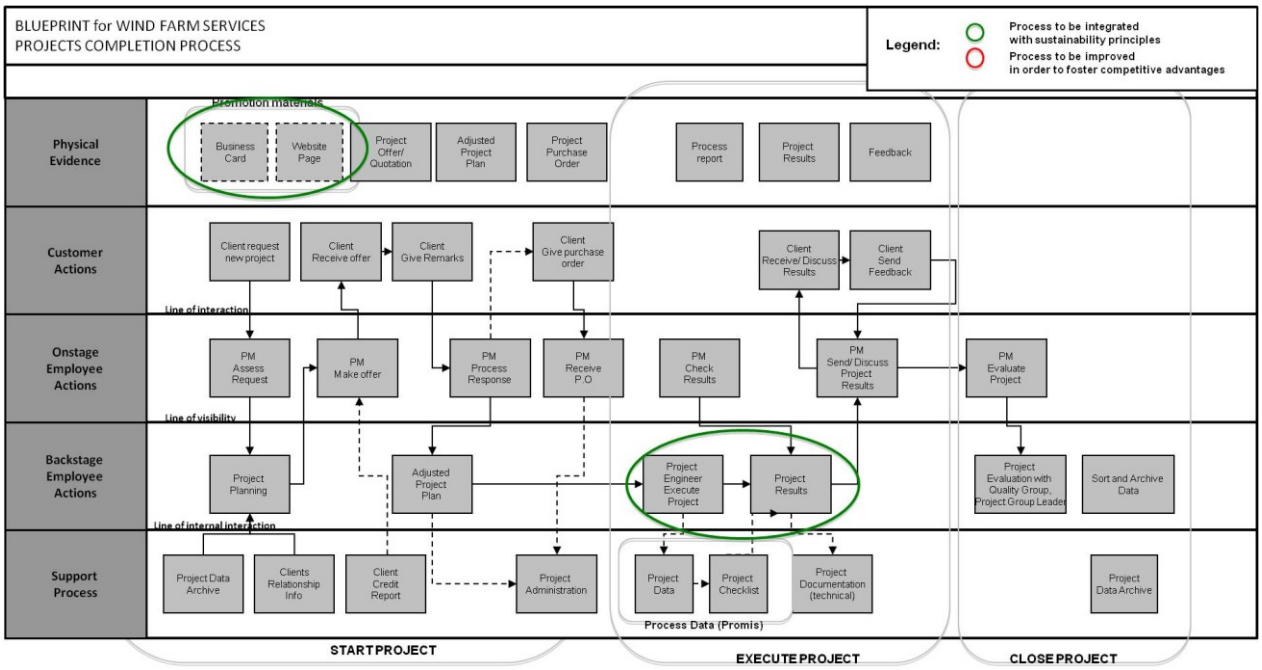
Mr. Ron Kammeijer also stated that the issues currently appear within this business unit is the shortage of engineers, that means they need more people to support each project and to contribute better business performance to the company. But, since they already have their own developed design-software, they have the ability to work faster and more efficient compared to their competitors. However, in order to compete, they need more worldwide representatives to be more locally presents in the target market.

Argued by Mr. Ron Kammeijer that even though there are awareness in the industry and force from the government to contribute better environmental impacts, in order to be sustainable, a company should pay more attention on human investment, or in other words, invest more on developing a better human resources because better employees means better company performance. Sustainability wise, the business indirectly protects the environment by designing the most efficient wind turbine for its customers and participating in renewable energy production, the government forces toward the production of renewable energy have been one factor that fosters its financial performance, and one aspect that mostly concerned in the extent of social engagement is the issue of employment.

2. Business Unit Wind farm Services (MECAL WIND FARM SERVICES BV)

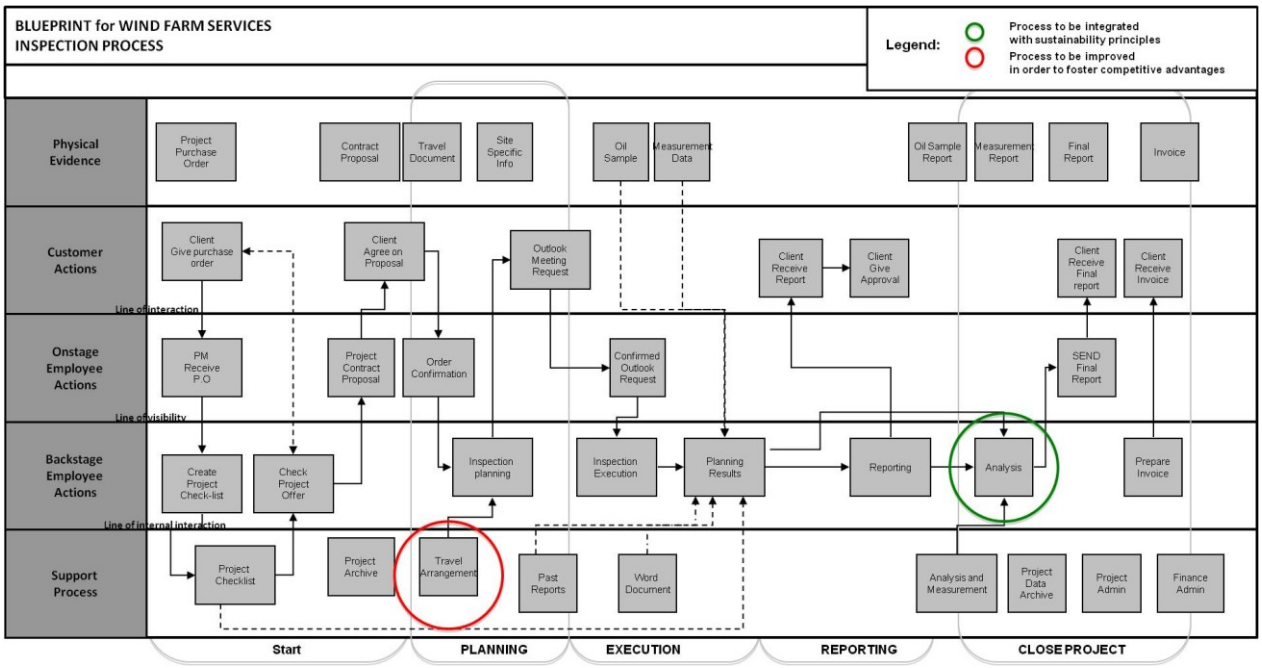
The basic activities of Wind Farm Services (WFS) business unit of MECAL BV is providing advice to corporations, banks, and investors regarding their investment decision for a wind farm. According to Mr. Eric Kamphues, the business unit manager of MECAL WFS, 3 main services provided by WFS are Due-diligence, Inspection, and Development & Realization support. Basically, due-diligence is the services to support investors for an acquisition of a wind farm that includes the analysis of technical, economical, and social aspects of the wind farm; risk evaluation; financial planning; and advice throughout the wind farm development. Inspection service is mostly provided for the existing wind farms, and this service includes supplier audit, end-of-construction advice, periodical inspections, etc. The services of Development and Realization Support are mostly about construction and performance monitoring of wind farm.

In order to provide qualified services to the clients, this business unitis not only dealing with the people internal the company (e.g. business unit manager, project managers, engineers, operational people, director, shareholders, etc.), but also has to deal with the subcontractors, the partners (i.e. for due diligence and inspection services), and the suppliers that support the operational tools and equipment of this business unit. The services processes of this business unit are portrayed in the following service blueprints.



Source: Self-constructed

Fig. 21 Service Blueprint of Wind Farm Services – Big Projects



Source: Self-constructed

Fig. 22 Service Blueprint of Wind Farm Services – Inspection

The target market of Mecal WFS is the wind farms all over the world, and according to Mr. Eric Kamphues, up until now Mecal WFS has been doing its business with the clients in Europe, Asia and the United States. In doing so, there are some requirements for conducting the business. Mr. Kamphues argued that the clients or partners from Europe and the U.K mostly takes Health and Safety procedures as a priority, Mecal WFS must comply with the Health & Safety regulation applied in the related market. Meanwhile, the clients in the United States concerns more on the knowledge of their partners in wind energy industry, especially because European companies are perceived to be more expert in the industry. In Asia, the clients and partners do not really take the Health and Safety regulation seriously; they tend to be more concern about the knowledge transfer and the prices of the products.

Regarding to the competitive existence in the market, Mr. Kamphues believed that the strengths of his business unit includes the knowledge of the business and the industry (i.e. operation system, maintenance procedures, and wind turbine technology), the capacity to be actively involved within all phases of the wind farm's lifetime, the ability to comply with the "Health & Safety" regulation in the industry, and the satisfying reporting system for the clients and partners.

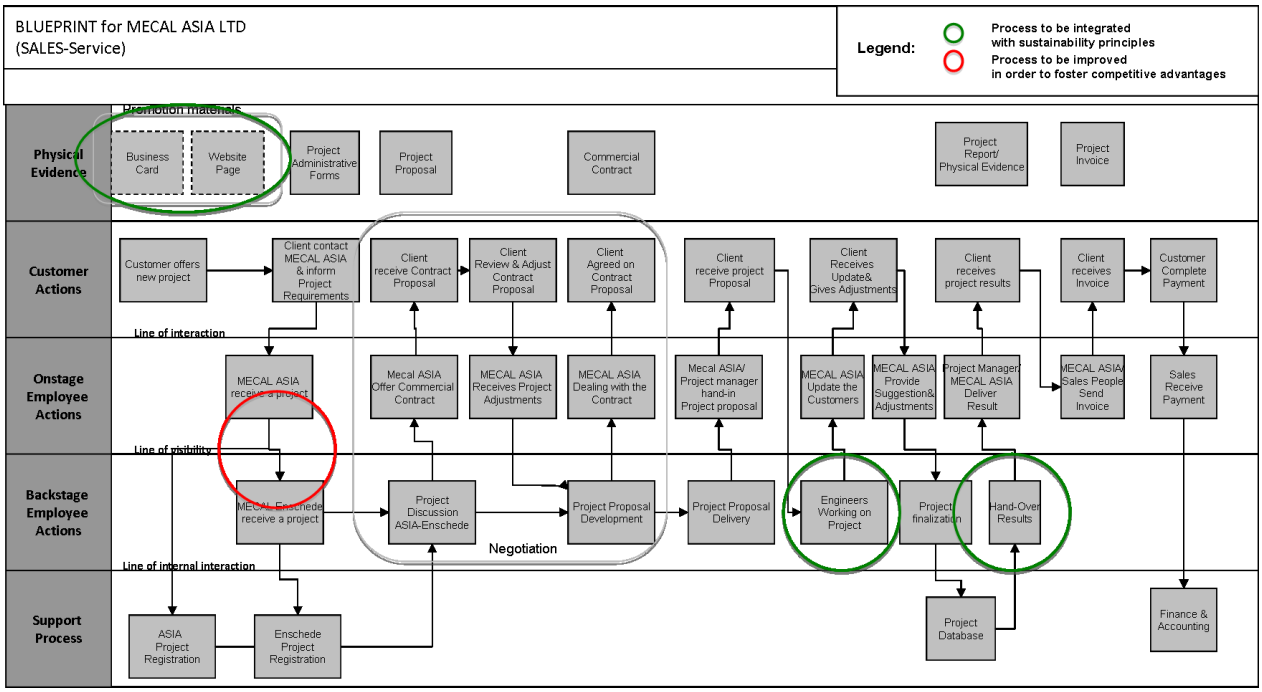
Being involved in the renewable energy industry makes Mr. Kamphues aware of the environment sustainability. He proposed that *a sustainable business is a business that creates its own future by producing positive impacts to the environment and to the people who live within it.*

Subsidiary: MECAL ASIA Co. LTD

MECAL ASIA Co. LTD (Mecal Asia) is located in Tokyo, Japan, as a subsidiary of MECAL BV in Asia, was established with purpose to conduct sales project development, to foresee potential business development, and to strengthen the business relationship with the local clients, especially in wind energy business of MECAL BV. Currently Mecal Asia is mostly conducting its business in Japan, while also preparing the office in China and starting to foresee the business in Korea. According to Mrs. Aoyun, the general manager of Mecal Asia, the market in Japan is more stable compared to the market in China in the extent of the business profits. Even though China is a potential market to be conquered, the market is really competitive and rapid changes in the market often occur, and the business opportunity cycle is shorter that forces Mecal Asia to adapt with better positioning and better strategy to compete in the market. Meanwhile, Korean market is still new for Mecal Asia and the company still needs to learn and adapt with the situation in the market.

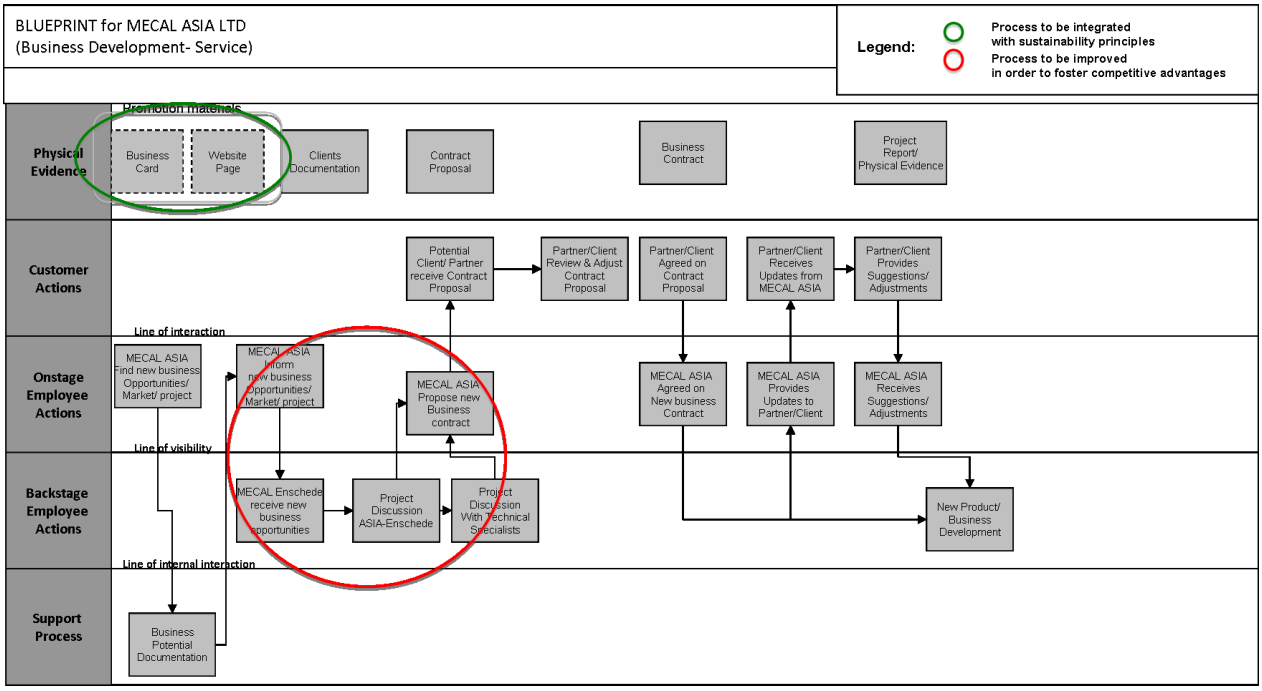
Lead by Mrs. Aoyun that fluent in Chinese, Japanese, and English languages, this subsidiary of MECAL BV has successfully bridge the gap of cultural differences between European corporation culture and the characteristics of the Asian markets. In addition, the local market requirements are also fulfilled by the establishment of Asian subsidiary of MECAL BV. As such, according to Mrs. Aoyun, in business-related aspect, what most important in wind energy market in Asia is not about the height of the wind turbine as it is mostly required in Europe. As typical Asian more concern in efficiency, what more required in the wind energy business is more about the production rate of energy that could be produced by the wind turbine.

However, as it is a commercial representative in Asia, Mecal Asia is not well equipped with technical specialists to support the project development. It is an issue to be considered that since Mecal Asia has to rely on MECAL BV engineers in The Netherlands to assist them in conducting the project in Asia, some of the projects were being canceled by the clients because the project delivery was too slow. Depicted below are the service blueprints of Mecal Asia.



Source: Self-constructed

Fig. 23 Service Blueprint of MECAL ASIA Co. LTD – Sales



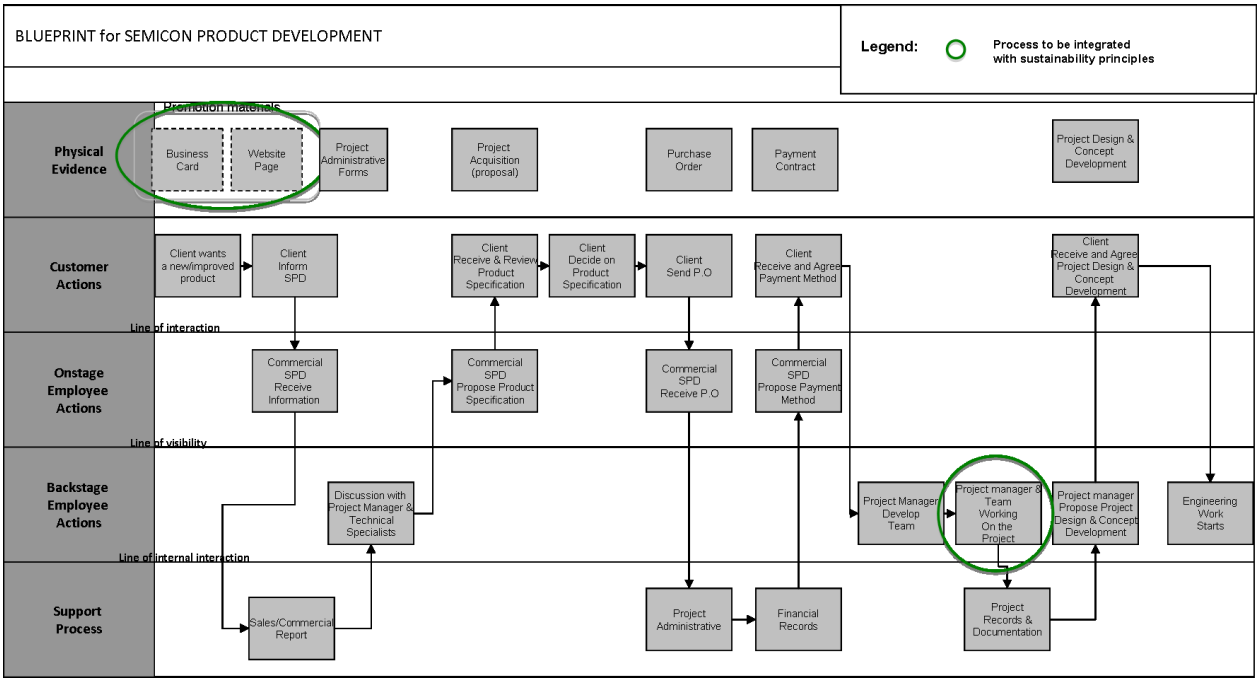
Source: Self-constructed

Fig. 24 Service Blueprint of MECAL ASIA Co. LTD – Business Development

In order to be sustainable, Mrs. Aoyun suggested that a company has to ensure the fulfillment of the client's expectation. A company needs proper strategies, including better positioning in the market and good financial cash-flow; a good management team to support the achievement of the company goals; well-trained people with adequate knowledge about the business that the company operates; and participation in the society or industry association to provide better environment.

Business Unit Semiconductor Product Development (Mecal Eindhoven) -Mecal Applied Mechanics BV

The Semiconductor Product Development (SPD) business unit basically operates to develop high-technology products for its customers, such as Mechatronic Development, Simulation & Measurement, Motion Control Tuning, and produce its own ready-to-use products, such as Hummingbird (an active vibration isolation technology product), SERIOS High Performance Phi & Z- Axis System (positioning equipment), and DOSCASCARA robot (a product for dynamic balancing of actuation forces and moments). The service processes are illustrated below.



Source: Self-constructed

Fig. 25 Service Blueprint of Semiconductor Product Development

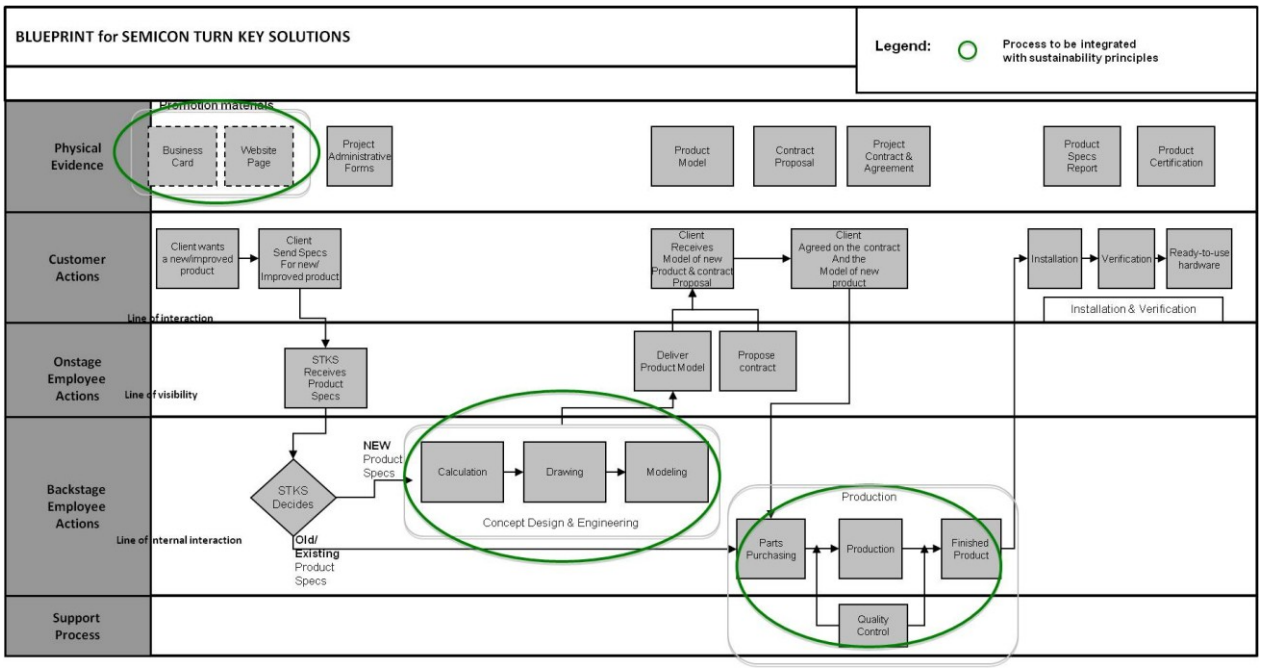
According to the SPD business unit manager, Mr. Bernhard Bakker, since the product is vibration-sensitive and built to provide high-accuracy, they have distance-requirement in serving its customers. The SPD mostly deliver the product within 300 Km radius from Eindhoven, The Netherlands. Therefore, only the Netherlands business codes that implied on this business.

Mr. Bernhard Bakker perceived the ability of his business unit to provide engineering service in high-tech life from concept generation to service production of his business unit is the strength to compete in the market that requires rapid change in innovation and products improvement. As such, it is the challenge for the company to manage its financial situation since SPD business requires huge capital spending, especially to buy new and advanced machineries.

From Mr. Bernhard Bakker's point of view, the products or services that the business provides are not directly harming the environment, he, personally, more concerns about the business impacts on related society, especially in the extent of people attitudes and mentality (e.g. corruption and bribery) therefore, a business-guidance as Codes of Conduct is perceived to be crucial. He stated that a Codes of Conduct will facilitate the people in the company to build better social environment and will foster the achievement of being a reliable engineering service company. To be emphasized, in order to have a sustainable business, a company needs a proper Codes of Conduct and sustained financial performance.

Business Unit Semiconductor Turn Key Solutions - (Mecal Pantheon BV and Mecal LLC)

Mecal Semiconductor Turnkey Solution (MECAL STKS) is a sales-driven business unit of MECAL BV that offers a total package Machine Support Frame – from concept design to production to installation and provides the technology and services for the clients to perform more reliable, efficiently and more cost effectively. The package includes site survey to optimize systems and control settings to the mechanical behavior when placing new equipment; production of Machine Support Frames of which the sites and partners are ready for large volumes production as well as production for customized products; installation and verification to ensure correct installation process and delivery time, and strict verification measurements to validate the machine specifications, including a comprehensive report for future developments. Those processes simply illustrated below.



Source: Self-constructed

Fig. 26 Service Blueprint of Semiconductor Turnkey Solutions

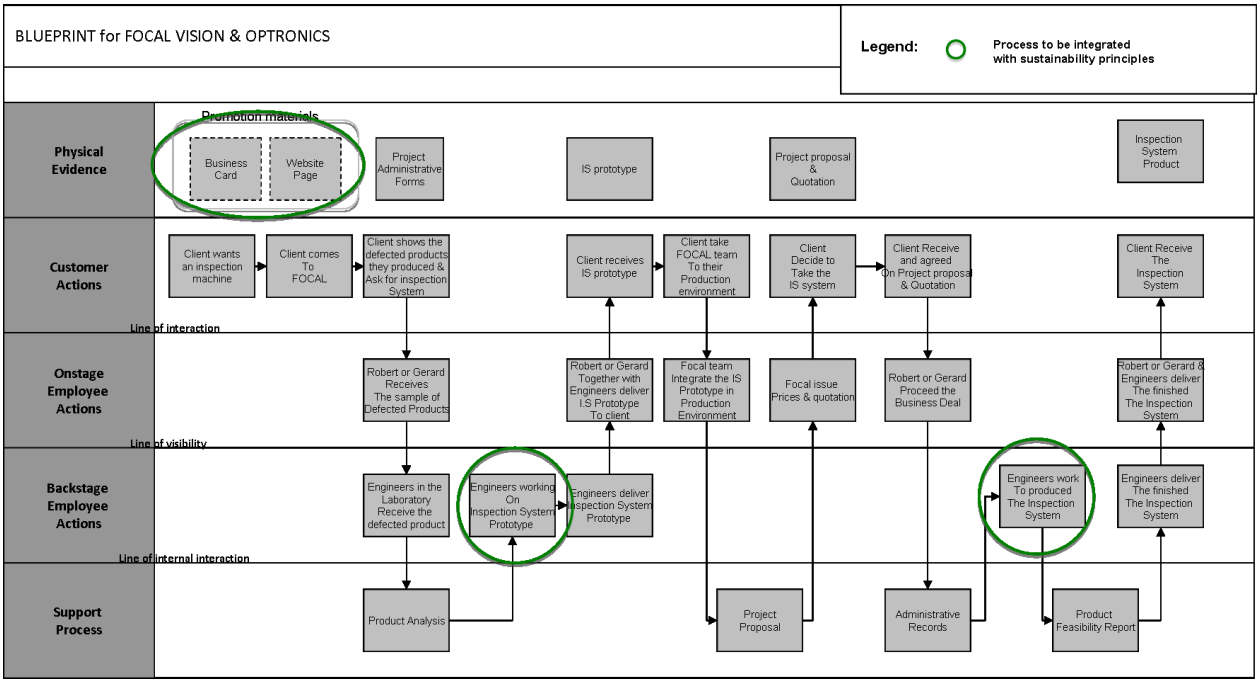
According to Mr. Thomas Dunne, the business unit manager of Mecal Pantheon BV and general manager for MECAL LLC (Unites States), the advanced service level and the best product quality that provided by his business unit are the key competitive drivers that allow the business to serve the global key clients, which are three major companies that develop chip production machines: Nikon (Japan), Canon (Japan), and ASML (The Netherlands), and partly serve their customers (i.e. Intel, IBM, etc) around the world. As the achievement is not a singular effort, Mr. Dunne believed that the following issues are important to be considered in running the business:

- Advanced Engineering (good engineers and good product quality)
- Sales or commercial team with good customers relationship
- Supply chain management
- Employees with high motivation that supported with conducive workplace
- Advanced level of services accompanied by the product delivery

Mr. Dunne perceived CS as the matter of keeping the company alive. Therefore, he argued that the best way to sustain the business and to improve the company's profitability is by keeping sustainable relationship with the major clients. MECAL STKS have built an extensive global network, including production partners and sites in the USA, Europe, and Asia to guarantee short lead times and to provide local customer service. Mr. Dunne acknowledged that his business operations do not directly harm the environment; therefore he explained that the local sites of the production facility are developed to reduce the air-freight spending as well as the resources consumption of shipping the products.

Business Unit Vision and Optronics- MECAL FOCAL BV

MECAL FOCAL BV (Focal) is the entity of MECAL BV's business unit that runs specifically in vision and precision inspection industry. Focal develops and deliver vision inspection system with high-rate of precision for manufacturing companies. The business unit manager, Mr. Robert Evers, briefly explain the business processes as depicted in following blueprint.



Source: Self-constructed

Fig. 27 Service Blueprint of Focal Vision

Spreading its activities in Enschede, Barrendrecht, and Eindhoven, Focal mostly serves its customers in The Netherlands area and only has one customer in Switzerland. Since Switzerland is still located in Europe, the ISO 9001 and CE certificate that Focal applies are still applicable and there are not many differences in the requirements of conducting the business, except for preparing the product user manual in German language.

Focal is a newly established entity of MECAL BV, and MECAL BV owns 50% shares of Focal. Since it only has been running for two years, there are still many issues to be solved. The lack of standard operation procedures, commercial team, and adequate number of engineers, are the problems Focal still need to overcome. According to Mr. Robert Evers, the issues are the challenges that can be solved by Focal's strength in advanced knowledge in vision technology.

In the extent of sustainability initiatives, Mr. Robert Evers believes that in order to have a sustainable business, a company must focus on product innovation, which means to be ready for the solution of tomorrow, especially when customers needs it in the future.

Mecal Facilities

According to Mr. Dick van Haare, who responsible for company recruitment and public relation activities, there are 14 people work in the support office of MECAL BV that divided into several divisions: IT support, Human Resources Management, Facilities, and Public-Relation. The activities of the support office are to provide operational supports for the business units of MECAL BV. Since most of the activities are conducted within the offices of MECAL BV, the rules or regulations that applied are Dutch rules, except when they handle international dealings, such as international promotion events and international employee recruitment.

Different with the other business units in MECAL BV, the Mecal Support team mostly came from managerial background. Mr. Dick van Haare believes that the support office plays the key role in bridging the gap of technical-related people and works with the external environment, especially the communities outside the engineering field. As it is developed to support the businesses of MECAL BV, the customers of Mecal Support are mostly the business units within MECAL BV. Mr. Dick van Haare also argued that it is challenge to integrate all the needs and goals of all internal parties in MECAL BV; bottom-up and top-down approaches are crucial to achieve the corporate goals of MECAL BV.

Regarding the office daily activities, the internal supplies and facilities are being managed on the corporate level by Mrs. Gea van Vegchel. According to her, the facilities that being managed are the office building, including the water and power consumption, maintenance, and housekeeping; the office furniture; kitchen supplies; office supplies; and insurance of the employees.

In doing so, the facilities department is highly related with the suppliers (i.e. food supplier, office supplies suppliers, the cleaning service company, insurance company, and the company to take care of the office wastes. Internally related, the managing director highly involved in setting the budget of the office monthly expenses, while business units are the customers to be taken care of, because their daily needs are the responsible of the facilities department. According to Mrs. Gea van Vegchel, the facilities department set the standard of office supplies inventory level while also prepares the basic office kit for each employee. Regarding the costs involved in managing those responsibilities, most the costs are being processed in monthly basis even though the purchasing activities adjusted with the needs of the office.

Mrs. Gea van Vegchel perceived a sustainable business is the business that cares on the environment and ensures the business works in a good way. Therefore, in order to sustain the environment, even though MECAL BV has not socialize the recycling culture, she assists the management of the office wastes by always differ the paper wastes and non-paper ones and allow the garbage company recycle the wastes easier. In addition in purchasing activities there are always considerations of improving the efficiency both on costs and on the impact to the environment such as product prices, product materials, and consideration on purchasing second-hand equipments. However, it is crucial to socialize the sustainability mindset on all the employees that afterwards could be integrated on their working behavior.

Appendix 7. The Results from the Questionnaires to the Customers / Partners

CS Interview Form

Company	**:E.ON Climate &Renewables GmbH**
Respondent Name	**:Christoph Kraft**
Position in the company	**:Technical Excellence - WTG**
Date and Time	**:16th November 2010**
Location	**:Düsseldorf - Germany**

1. Defining sustainability is the first critical step in developing a plan for a sustainable product. From your perspective, can you tell me what the definition of a sustainable business is?

   No impact under technical and commercial impacts for a product from the beginning of development until the complete chain during lifetime until the end of the lifecycle with all affected impacts

2. Sustainability is becoming a major growth driver for the company. Does your company apply sustainability program(s)? If so, can you tell me what your company's definition of sustainability is and what your company's sustainability program is about?

   Development of cleaner energy, reduction of the Carbon footprint and optimization of the technology in the existing fleet in existing plants

3. Can you explain the dimensions of your company sustainability that are most (or should be) important in your business?

   Upscale of renewable energy and optimizing the efficiency of fossil fired power plants

4. What are the roadblocks or constraints that you see preventing more forward progress for implementing the sustainability program in your business practice?

   Regulatories by the government, acceptance of the general public and limitation of technology

The next questions are designed for the company that has applied the sustainability program, or is in progress of doing so. If your company has not applied this, please feel free to leave the questions unanswered and send this form back to me to share your ideas on sustainable business practice.

5. Other than applying the program externally for the society and environment, does your company integrate the idea within the company internal operation (i.e. HR management approach, Standard Operation Procedures, Employee Manual, Workplace Safety Policy, Codes of Conduct, corporate culture, etc)?

   Several topics (procedures, policies etc.) are established to integrate a further sustainable business then in the past.

6. Based on your opinion, what are the requirements for a successful CS program, so as to provide real value to the environment and society?

   Openness, clear strategy and willingness, not only a marketing gag

7. Do you think that you need sustainable partner(s) to achieve your sustainability goals? Why? Are there any specific requirements or code to comply for your partners or suppliers?

   I don't think so, because we a big company with several divisions in technical and environmental aspects and a lot of existing collaborations with universities, public organization (i.e. Greenpeace etc.)

8. Do you agree that companies should be completely transparent to the public, especially consumers and suppliers regarding their sustainable activity? To what extent?

   In line, because transparency is essential for the public acceptance. This openness should involve the daily business, but shouldn't into technical high data

9. Any final thoughts or advice for companies looking to integrate sustainability into their organizations?

   Don't try to hide ;-) and be open, take the chance to ask and share knowledge

Corporate Sustainability Interview Form

Company **: Hitachi High-Tech Fielding Corp.**

Respondent Name **: Ichiro Kawamura**

Position in the company **: Manager, International Sales Department**

Date and Time **: November 8, 2010**

Location **: Tokyo, Japan**

1. Defining sustainability is the first critical step in developing a plan for a sustainable product. From your perspective, can you tell me what the definition of a sustainable business is?

Our company vision clearly mentions that through our business activity, we contribute to the progress of the society, which is our sustainable business stands for.

2. Sustainability is becoming a major growth driver for the company. Does your company apply sustainability program(s)? If so, can you tell me what your company's definition of sustainability is and what your company's sustainability program is about?

Corporate Social Responsibility (CSR) is a key word for the corporate sustainability.

Especially, Environmental CSR is required recently for a company to conduct business worldwide. We belong to Hitachi group, and Hitachi is executing Environmental CSR program in the group companies. We also make Environmental CSR regulations in the company rule, which include Environmental CSR products manufacturing rule, Restriction to use Banned Chemical Substances in products, etc.

3. Can you explain the dimensions of your company sustainability that are most (or should be) important in your business?

Profit is the most important aspect for the company sustainability. Also the CSR is another important aspect for a company to exist the society.

4. What are the roadblocks or constraints that you see preventing more forward progress for implementing the sustainability program in your business practice?

Cost and manpower

The next questions are designed for the company that has applied the sustainability program, or is in progress of doing so. If your company has not applied this, please feel free to leave the questions unanswered and send this form back to me to share your ideas on sustainable business practice.

5. Other than applying the program externally for the society and environment, does your company integrate the idea within the company internal operation (i.e. HR management approach, Standard Operation Procedures, Employee Manual, Workplace Safety Policy, Codes of Conduct, corporate culture, etc.)?

We have ISO promotion center in our organization, and are concentrating CSR related matter in this organization.

6. Based on your opinion, what are the requirements for a successful CS program, so as to provide real value to the environment and society?

This is very difficult matter to answer. I think it is very important for every employee to understand necessity and importance of the program at the same level, and act vulnerably for keeping the program.

7. Do you think that you need sustainable partner(s) to achieve your sustainability goals? Why? Are there any specific requirements or code to comply for your partners or suppliers?

CSR cannot be achieved only by a company. All related parties from a supplier to an end user need to corporate. The same level of understanding on CSR is required for all parties.

8. Do you agree that companies should be completely transparent to the public, especially consumers and suppliers regarding their sustainable activity? To what extent?

I do not know it should be, but it is better for the company's activity to be transparent to the public because it will show the company's contribution to the society.

9. Any final thoughts or advice for companies looking to integrate sustainability into their organizations?

Restrictions and regulations become increasing and complicated worldwide now.

If you think CSR is important and want to survive in the world market, you may think to have an exclusive function for CSR in the organization.

One violation to the world rules/regulations may cause fatal damage to the company.

Appendix 8. Details of Industries Overview

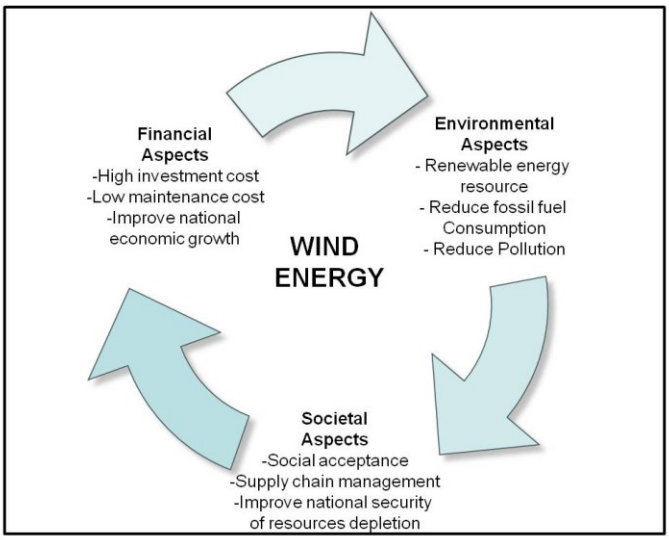
Wind Energy:

Wind energy is one of the alternatives in renewable energy resources that perceived as a growing business regarding its ability to reduce the dependency on fossil fuels consumption (Herbert et al., 2007). Europe is the global leader in wind energy industry (Ibid). And, even though the markets are growing rapidly in the U.S and Asia, the global success in wind energy technology and renewable energy industries are still lead by Europe because it was supported by several factors: the increasing costs of fossil fuels, the increasing demand for wind turbines combined with the rising of commodity prices and supply constraints, and the EU regulation and market demand in Europe for renewable energy resources (EWEA, 2009). These governmental forces also occur in the United States as the national policies toward the renewable energies are playing a vital role in supporting renewable energy industry, protecting the planet's climate, and enhancing the national economics while also creating job opportunities for the citizen(AWEA, 2008).

Even though the production cost of wind energy is high and requires enhanced production technology, wind energy industry is perceived to have the ability to battle climate change, reduce CO_2 emissions from the global power generation and provides several benefits, such as significant reduction in fossil fuel consumption and other costs reduction that relate to energy dependency as operation and maintenance costs, and decentralized and increased rate of global employment due to the opening of manufacturing and operation centers and many wind-related activities in emerging markets (EWEA, 2009). In other words, the development of wind energy business is beneficial not only for environmental, but also for economic reasons. However, despite of benefits and opportunities in the market, there are several barriers in the market. EWEA (2009) states that the barriers faced in the market might be classified in three aspects: administrative, social and financial. The barriers in administrative areas include barriers during the process of acquiring building permits, spatial planning licenses, and grid access. The social barriers mostly involved activities of getting the acceptance from society regarding the wind farm development. Financially, secured financial support from the investors or developers is crucial, especially because wind turbine development requires advanced technology and expensive investments.

It is argued that the key competitive driver in wind turbine supply is supply chain management (EWEA, 2009)of the relationships between turbine manufacturers and component suppliers. And, in order to compete in the wind industry, the company should have the three key elements in the supply chain: local market knowledge, technical expertise, and the financial capacity (Ibid.).

In the extent of sustainability, the major issues within the wind energy industry can be illustrated in Figure 28.



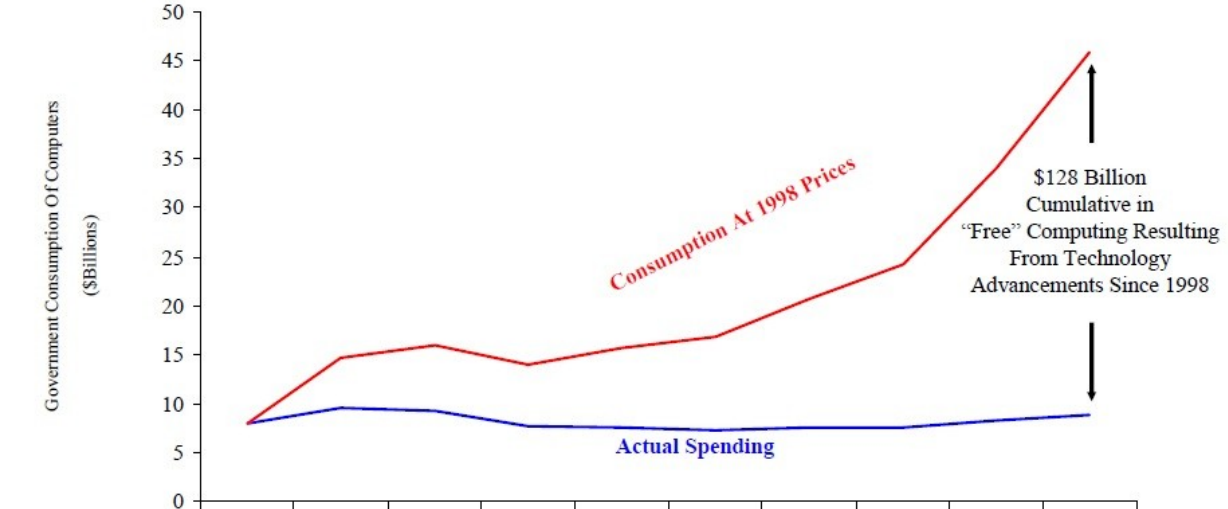
Source: Self-constructed, adapted from EWEA (2009) and Herbert et al (2007)

Fig. 28 Sustainability Issues in Wind Energy

Based on the financial perspectives, even though the maintenance cost of a wind farm is relatively low, the development of a wind farm requires a high initial investment, especially for the wind turbines with advanced technology. The positive aspects of wind energy resources are the facts that the energy source is renewable and its utilization could reduce the world's fossil fuels consumption. To critically bear in mind that it becomes a global dilemma of renewable energy resources as wind energy resource is environmental-friendly but it threatens the global economy since it reduces the global consumption of fossil fuels (Herbert et al., 2007). With respect to the social aspect, the development of this renewable energy technology and development require support and acceptance from society (EWEA, 2009), and a good supply-chain management of the hardware manufacturer, project development, power generation, finance and consultancy agency (EWEA, 2009; Herbert et al., 2007).

Semiconductor

In any given day, a businessman might use his computer to communicate with a client in the other part of the world, or a truck driver may be given instruction from a GPS equipped in his vehicle to determine the shortest route to cover all of his delivery. Although the applicability may be differing, all share one thing in common: the reliance on semiconductor-related technology in human daily activities. In the last three decades, the semiconductor industry has been providing the basic building blocks of the modern global economy. It has revolutionized every major form of human economic behavior and made possible productivity increases in many industry sectors. From the use of mobile telephone, online banking system, to managing industrial equipment and increase efficiency of product testing, semi-conductor have entailed in human life and many economic routines.



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Actual Spending	8	9.5	9.2	7.7	7.5	7.2	7.6	7.6	8.2	8.8
at '98 Prices	8	14.7	16	13.9	15.7	16.8	20.6	24.2	34	45.8

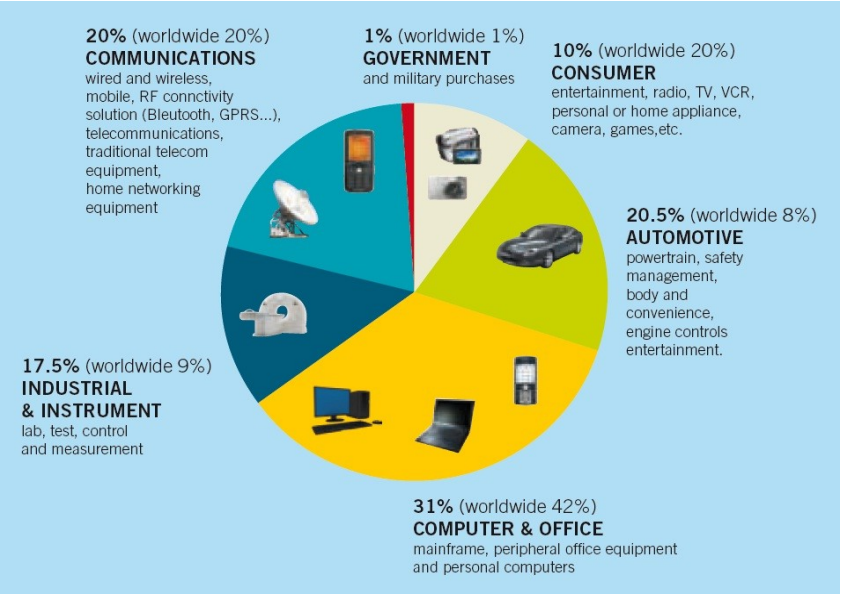
Source: Dewey and LeBeouf (2009)

Fig. 29 Computing price based on semiconductor declines allowing government to do more with same price

In many developed nations, semiconductor-enabled technologies have been one of the largest contributors to the exporting industry, a major source of employment opportunities, a stimulus to development, and the basis for improving the overall quality of life (Dewey and LeBeouf, 2009). The reason behind the success of semiconductor technology is the continuous innovation made by its manufacturers. Since the invention of the first microprocessor in the late 1970s, the continuous innovations of semi-conductors have been vastly increasing which lead to a better, faster and cheaper technology. Through these innovations, there are significant increases in the functionality while the costs to produce the semiconductor-based products (e.g. computers, telecommunication equipment, etc.) are declining considerably. As a result, many features in aircraft, automobiles, scientific instruments and a number of other products are of higher quality without comprising the production cost. As an arbitrary example, the U.S. government can now do much more information technology-based work without spending more money than they did in the past (Figure 29).

The technology itself has developed into many applications. The differentiation of products based on semiconductor technologies is presented in Figure 30. As depicted in the diagram, the biggest contribution of semiconductors lies within the microprocessor technologies (i.e. office equipments and personal computers), followed by communication and the automotive industry. It is said that the performance breakthroughs and new innovations in semiconductor-related devices have resulted in positive economic returns and stimulated higher levels of economic productivity (Laitner et al., 2009). During the past decade (1995 to 2006), the world productivity growth rate was increasing by 2.8 percent

annually. Some experts say that this rapid growth has occurred as the use of semiconductor-based technologies expanded, especially in the realm of information and communication technologies (Laitner and Ehrhardt-Martinez, 2008; Jorgensen et al., 2005). Thus from the commercial aspects, it is likely that the future of semiconductor industry will remain to be prospective. Some however, are beginning to concern in the relationship between semiconductor technology and its energy consumption rate (cf. Laitner et al., 2009).



Source: European Semiconductor Industry Association (2009)

Fig. 30 The different semiconductor market mix in Europe and the rest of the world

Since the development of the first transistor in the late 1940, semiconductor-based technologies have given positive impacts to the economy and quality of life in general. However, their effect on energy productivity has received much less attention. This lack of recognition is caused by what scholars have called *the high tech energy paradox* where analysts tend to give more attention to the energy-consuming characteristics of semiconductor devices than to their energy-saving capacity (Laitner et al., ibid.). According to Dewey and LeBeouf (2009), semiconductors enable the use of alternative energy sources more effectively, distribute it more efficiently, provide important components to reduce greenhouse gas emissions and increase energy security. As such, semiconductors have already been responsible for significant energy savings in human daily life.

Currently, there has been a shifting in the main use of semiconductors technologies. More and more companies are now enabling semiconductors as a part of their contribution to the challenge of energy consumption and to reduce a negative impact to the environment. Some progress towards energy productivity benefit has already been visible. For instance, further advances in chip technology could allow a mobile to run off a single battery for extended periods, perhaps even years. Semiconductor

technologies are also being applied to solar power systems that enable laptops and other electronic devices to be recharged using solar power and to operate in ambient indoor light. Semiconductors also play a key role in electronics used in both solar and wind-generated power systems, including solar inverters and wind turbines, which convert direct current from solar panels or turbines into usable household alternating current. With the latest chip technologies, system efficiency is maximized so they can be productive even on cloudy and low wind days.

Visual Inspection System

Optics is one of the growth areas of modern physics and engineering. As a result, optics finds applications in almost every society daily life, and optical devices are crucial components in many sectors of industry. One of many uses of optical technology is the visual inspection system. Indeed, the global market is increasingly demanding in terms of quality and flawless products. Human vision often has limited accuracy and cannot be used to evaluate changes in visual appearance. By enabling optical devices, a precise, repeatable and high-speed evaluation method can be achieved. A visual inspection system can take millions of data points in fraction of a second. Furthermore, with a growing achievement in scientific discoveries, measurement resolution can now approach up to one micron (Dawson, 2005). Typical applications for optical inspection system include:

- Gauging the diameters and concentricity of holes in automotive parts
- Checking for cracks, flaws, contamination, scratches and other defects
- Evaluating molded parts against 3D CAD data
- Reading barcodes or text
- Grading agricultural products

However, there is not much specific information regarding the sustainability initiatives within the visual inspection system industry, the only that matters may be the actions taken by the business partners.

Appendix 9. Letter from John Patterson (IBM) to MECAL BV

Dear IBM Supplier:

IBM has expected its suppliers to operate in an environmentally responsible manner for decades. Accordingly, our management system has included various environmental and supply chain social requirements for our suppliers. In addition, in 1998, IBM explicitly encouraged its suppliers to align their own environmental management systems with International Standards Organization (ISO) 14001 and to pursue registration under this international standard. In 2004, IBM published its Supplier Conduct Principles to articulate the company's overall supply chain social and environmental requirements.

These early initiatives and actions - taken well before the present day focus on "green" -- have served IBM and its suppliers well, underscoring how effective environmental management makes good business sense. As we begin a new decade and in recognition of the continually growing imperative for environmental and corporate responsibility across supply chains, I am writing to inform you about some new requirements we are now setting for our suppliers in this important part of business.

Specifically, IBM will now require all of its suppliers to:

- define, deploy, and sustain a corporate responsibility and environmental management system;
- measure performance and establish voluntary environmental numeric goals
- publicly disclose results associated with these voluntary environmental goals and other environmental aspects of the management system

Many of you have already been doing this for several years, and you have recognized -- like IBM -- that environmental leadership fosters business efficiency and effectiveness. You have also accepted that environmental responsibility and accountability resides at home, in your own business operations. For others, these requirements may represent a new way of doing business. Nevertheless, we trust you are familiar with the underlying issues since we previously wrote about ISO 14001 and IBM's Supplier Conduct Principles. What may be new, therefore, is taking the next steps to establish a formal management system, measure performance, set goals, and disclose results.

There are certain basic elements that are necessary to put these requirements into action. We have stated them in the attachment below. IBM's own practices are built upon them, yet they are certainly not exclusive or limited in applicability to any one company or any particular industry sector. Although we are now asking you to include these elements in your work, we are not prescribing a uniform set of programs and goals. We realize there is not a "one size fits all" solution. Instead, we ask each supplier to deploy a management system, measure performance, set goals, and disclose results in a way that reflects your company's particular intersections with corporate responsibility and the environment.

Whether these requirements are new to you or not, IBM believes they are important and expects its suppliers to meet them. Questions pertaining to these requirements should be directed to your IBM procurement contact person.

Thank you for your attention to this important matter.

John Paterson
Vice President, Global Supply and Chief Procurement Officer

Appendix 10. Supplier Requirements from IBM

Supplier Requirements

IBM's Requirements for Suppliers Regarding a Corporate Responsibility and Environmental Management System, Measuring Performance, Setting Goals, and Disclosing Results

IBM asks its suppliers to:

1. define, deploy, and sustain a corporate responsibility and environmental management system that identifies significant aspects of the supplier's intersections with these matters, including those articulated in IBM's Supplier Conduct Principles and the Electronic Industry Citizenship Coalition Code of Conduct
2. establish programs (within the management system) to control operations that intersect with these matters and confirm compliance with applicable law, regulation and any particular contractual requirements
3. measure performance associated with supplier's significant environmental aspects where applicable and include at a minimum each of the following aspects common to virtually all businesses:
   - energy conservation
   - scope 1 and scope 2 greenhouse gas emissions *
   - waste management and recycling
4. set voluntary environmental goals to achieve positive results associated with significant aspects where applicable and include at a minimum one in each of the three aspects cited in item 3 above
5. publicly disclose results associated with these voluntary environmental goals and other environmental aspects from the management system, including any regulatory fines or penalties that may have occurred
6. train employees who are responsible for performing this work
7. conduct self-assessments and audits as well as management reviews
8. cascade this set of requirements to the supplier's suppliers who perform work that is material to the products, parts and/or services being supplied to IBM

*Note:
scope 1 greenhouse gas emissions: direct emissions generated by the company
scope 2 greenhouse gas emissions: indirect emissions that are associated with the generation of electricity that is purchased and consumed by the company

Illustrative information about IBM's own Global Environmental Management System and environmental reporting and disclosure can be found at:

- http://www.ibm.com/ibm/environment/ems/
  (IBM's Global Environmental Management System)

- http://www.ibm.com/ibm/environment/annual/
  (Environmental Reporting and Disclosure)