Cand.Merc.IT (Master in Business Administration and Information Systems

Green Business Models – A Transformation Process and the Role of Policy

A Study of how Traditional Business Models are Transformed into Green Business Models and the Influence of Policy on this Process

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Date of hand-in: 5th April 2013

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Number of Characters:

Executive Summary

In the societal challenges of today concerning resource scarcity and environmental demise, businesses are increasingly found at the centre of debates regarding sustainability. The reason for this is that they are often identified as both the cause of many emerging ecological challenges, as well as the solution to them. Various terms and definitions have been developed over the years in the public and academic discussion about how organizations have begun greening their business processes in order to minimize exposure of future generations to resource insufficiencies and environmental hazards. One of the most recent, and most notable ones, is the concept of Green Business Models.

In order to get a more concrete and in-depth understanding of this term, this thesis examines the idea of green oriented business model innovation, by assessing how companies transform their existing Business Models into sustainable Green Business Models. In other words, focus is placed on identifying the factors that lead to the conception of sustainable business models. Furthermore, specific attention is given to role of Policy and Policy Makers with regard to this process.

The main contribution of the thesis is the formation of a framework based on the literature review, depicting how traditional business models are transformed into greener ones. Here, Green Innovation is recognized as the central aspect causing a process of Green Business Model Innovation, while Policy and Policy Makers are identified as having an important function in the development of Green Business Models too.

These outcomes are then challenged by data collected through interviews with members of two relevant case studies chosen. The result is an analytical discussion determining the developed frameworks' practical and theoretical implications for business, its limitations, as well as a number of reflective questions and suggestions for further research.

Key Words: Green Business Models, Green Business Model Innovation, Green Innovation, Policy and Policy Makers, Green Business

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List of Abbreviations

BM: Business Model

BMI: Business Model Innovation

CSD: Case Study Design

GBM: Green Business Model

GBMI: Green Business Model Innovation

RQ: Research Question

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Chapter 1: Introduction

1.1 Problem Field

Pollution and environmental demise have become some of the largest and most talked about matters in today's world. Global warming, ozone depletion, lack of control of toxic substances, air and water pollution, and unsafe waste disposal are but few of the issues frequently brought up. What is worse is that a large portion of these problems are often caused by businesses, yet can be significantly minimized or even in some cases completely abolished by undertaking a number of alterations with an environmental outlook.

Businesses are thus found at the core of debates and discussions concerning sustainability. As Bisgaard et al. (2012) state, it is because "*[t]hey are identified as the cause of the environmental challenges we face but also as the ones that can contribute to creating sustainable growth and a sustainable future*" (pp. 19). This thesis focuses therefore on how organizations are transformed into 'greener', more environmentally conscious units, while also considering the effect of policy and policy makers on such an undertaking, in an attempt to create and understanding and spur development of more Green Business Model frameworks.

1.1.1 Background

With businesses having been at the centre of controversy regarding negative environmental effects for a long time, a number of studies in the past have indicated that large parts of the pollution we are experiencing are concrete evidence of inefficient use of resources (Chen, 2008:A; Porter & van der Linde, 1995). Porter et al. (1995) claim that firms which better their resource management and pioneer in green innovation will enjoy the first mover advantage, allowing them to charge higher prices for their green products, whilst gaining a better image, developing new markets, increasing productivity while minimizing production waste, and finally resulting in the gain of competitive advantages through enhanced corporate competitiveness. This suggestion then raises the question of, why does every company not go 'green' if such benefits are to be gained?

The answer seems rather obvious; in order for any organization, or nation for that matter, to have a sustainable long-term growth path, innovation is widely considered to be of high significance.

It is the driving force that allows firms to remain competitive and gain a market edge, but it is also a notion that is rather complex and dynamic, and therefore cannot be possessed by all. More than this, for green innovation to be worthwhile, it requires support at governmental, institutional, business and consumer level to "*set the right framework conditions and provide enough support for successful research and business development*" (OECD, 2009, pp. 182). This way, it will enable long-term market possibilities and economic growth. (Henriksen et al., 2012:B; Bisgaard et al., 2012, OECD, 2009)

However, businesses themselves are also beginning to recognize that a major global green transition, whether they want to or not, will be needed to preserve the future of the global economy. This includes the greening of companies' own business or value chain activities in order to improve resource productivity and gain short, as well as long-term competitiveness, while also establishing new markets. In other words, the invention of new products and services does simply not suffice anymore. Instead, radical eco-innovation is needed as a means to achieve non-technological changes in the form of innovative green business models. (Henriksen et al., 2012:A, B; Bisgaard et al., 2012; FORA, 2009)

It becomes clear then that it is of high importance to achieve a better understanding of what the notion of Green Business Model Innovation (GBMI) entails, so that organizations and policy makers are able to understand the factors that lead to the development of greener business ways. This will in turn permit organizations to address more structurally the transformation process, while also allowing policy makers to contribute in a positive way to these developments, by creating policies and regulations that enable sustainable development. (Henriksen et al., 2012:B; Bisgaard et al., 2012; FORA, 2009)

1.1.2 What is Green Business Model Innovation?

Green Business Model Innovation (GBMI) is an emerging concept in the business world, taking up the challenge to reduce resource inefficiencies through promising green platforms for innovation. It suggests a new sustainable way of doing business, and has been described by the Danish Enterprise and Construction Authority's Division for Research and Analysis (FORA) as the "*...non-technological green innovation in and between companies which change[s] the core business [of a firm] from selling a product to selling a (full) service and at the same time retaining ownership of the product and responsibility for its functionality.*" (FORA, 2011, pp.1).

It, thus, defines an approach that invites an organization to innovate its existing business model and consider the total life-cycle costs of its products and services, thereby becoming more efficient (e.g. by reducing waste, optimizing resource usage, and lowering energy levels). GBMI is, in other words, a move that requires alterations in a company's value chain, the generation of new organizational models, different marketing techniques, an alternative research and development focus, etc. (FORA, 2009, 2011; Henriksen et al., 2012:A,B; Bisgaard et al., 2012)

As a framework, in its most simplistic form, it attempts to help firms successfully correspond to developing trends, changes, opportunities, and challenges posed by the emerging field of green business. To do this, a change process is required, resulting in transformation of the organizations' existing business model. This is done by combining current research from various areas of business to form a new and up-to-date, eco-focused and economically viable sustainable business model, referred to as a Green Business Model (GBM). GBMs are therefore defined as "*business models which support the development of products and services (systems) with environmental benefits, reduce resource use/waste and which are economic viable*" (FORA, 2009, pp. 8).

The general procedure described above, forms the platform for the process recognized as GBMI. Overall, it can be said that the more parts of the business model that are changed with a resulting green effect, and the stronger a green change is taking place within the various parts of the business model, the greener the business model innovation and subsequently the higher the potential for the creation of radical green innovation. (Bisgaard et al., 2012; Henriksen et al., 2012:A, B)

The benefits of the GBMI framework are that firstly it can provide companies with a competitive advantage as resource efficiency can result in higher productivity in the long run, it can enhance innovation which leads to a competitive edge and sustainability, and it can result in higher customer loyalty, subsequently leading to fewer players on the market. GBMI can also be seen as a shortcut to green growth. As the focus remains on technologically driven green developments, the non-technological side of green growth (e.g. innovation) remains unexplored. Innovation can lead to systemic changes of an organization and may occur across all sectors. The focus is therewith removed from incremental product changes and instead is placed on value of use through minimization of costs and maximization of innovation and growth. More than the

emerging new business opportunities and lower environmental impacts however, GBMI can also lead to improvements with regard to a company's branding (both for suppliers and customers), while increasing motivation amongst workers (and therewith sustain and attract the best employees possible). (FORA, 2009; Henriksen et al., 2012:A, B; Bisgaard et al., 2012)

As with any developing concept that brings about changes to the way business is performed, there are some challenges regarding the development of GBMs that remain unresolved, which in turn have an effect on future GBMI. Firstly, GBMs are not yet widely distributed amongst organizations, nor are they extensively used. Secondly, there is an obvious knowledge gap regarding actual benefits and costs amongst stakeholders (i.e. customers, suppliers, financing institutions, and governments). Thirdly, – and very significantly - there is a lack of understanding as to how GBMs come about, meaning how traditional Business Models (BM) are transformed into GBMs. Fourthly, policies regarding GBMs remain uncoordinated, withholding GBMI from achieving its prospective full potential and leaving therewith a blurry image as to their actual influence. At the same time, public institutions (e.g. municipalities, governments, local authorities etc.) are not providing adequate levels of GBM promotion though public procurement and regulation. Finally, both private and public institutions must alter their existing mind-set and become more open towards the development of new solutions and partnerships between one another, in an attempt to become more sustainable. (FORA, 2009)

1.2 Objectives and Research Question

The aforementioned challenges that GBMs are faced with are all of relevance and importance to the enhancement of their future innovation and the growth of green business. However, this thesis is specifically focused on investigating and providing insights to the question regarding how GBMs come about.

The reason for this is that GBMs and their innovation are rather recent concepts, with very little research conducted around them, causing a lack of relevant frameworks and general understanding around the subject. Absence of such frameworks and knowledge might lead to gaps and inconsistencies in the field, resulting in significant limitations to the further development of sustainable means and green business growth, both of which are thought to play an increasing role in the global business economy in years to come (e.g. through creation of new

markets, new jobs, competitive advantage etc. – also refer to Fig. 11, 12 & 13 in the Appendix) and the area of business models more generally.

Furthermore, an investigation of the role policies and/or policy makers' play in the process of GBM transformation will also be made. The assumption is that governmental intervention, or lack of it, plays a pivotal role when it comes to enhancing sustainability through GBMI. However, once more, little prior research exists on the matter, creating knowledge gaps and inconsistencies for firms willing to adopt a GBM (e.g. if a given government does not support green growth and GBMI, is it then possible for a firm to adopt a GBM and enter the green business sector successfully?).

The research focus of the paper therewith is stated as follows:

How are Business Models transformed into Green Business Models? How do Policies and/or Policy Makers influence this process?

The focus on enhancing knowledge surrounding the understudied notions of GBMs and GBMI has to do with the confidence of increasing the chances of a positive contribution to the field of green business and the business model literature, which, though vast, is still developing. For that reason, a presentation and elaboration of the main frameworks, notions and concepts comprising GBMI (the 'green' concept, business models, innovation, green innovation, business model innovation, green business models, and policy and policy makers) will be made. The main findings from these areas will result in the creation of a model, which will then be analysed and discussed with the help of case studies to identify its applicability. The case studies will consist of two organizations; a leading contracting and project engineering company called Semco Maritime A/S (primary case), and a legal disciplinary practise under the name Prospect Law Ltd, which specializes in the energy and environmental sectors (secondary/supplementary case).

The target audience for the thesis are firms who are currently involved in the green business, as well as those who plan to do so in the future. Insights can also be developed for policy makers, innovation leaders and strategy managers with regard to GBMI, GBMs and policy.

1.3 Delimitations

Though it is considered an important element of the GBM development, the economic aspects and actual costs of innovation and GBM transformation and implementation will not be contemplated here. The reason for this is the limited case studies considered, the space attributed for the thesis and the time set for completion. Further, the financial side of BMI forms a vast and complex field, requiring different knowledge and expertise than what is used to address the scope of this thesis and what the author is familiar with.

Another central facet, which will also not be addressed, is the importance of effective communication (both internal and external) and appropriate leadership when alternating a company's business strategy; namely the idea of change management. Once more, the cause is restricted space, time and resources.

1.3 Structure Overview

The structure of the paper can be conceived as deductive, meaning that it begins from a broad perspective and is gradually narrowed down to very specific research areas, with the assistance of qualitative research (Bryman & Bell, 2007).

The following chapter will present the developed literature review. It will provide a basic overview of the definitions and theoretical background information regarding the terms and notions that are related to the concept of GBMI and the research question at hand. An overview of the main findings will be presented at the end of the chapter together with a model developed depicting the transformation process of Business Models into GBMs. Chapter 3 will elaborate on the methodological considerations made with regard to the thesis, and the various limitations identified in this regard. Thereafter, chapter 4 will present the two organizations comprising the case studies, which will be used together with the model from the literature review to create an analysis and discussion of the research question (chapter 5), providing insights to the fields of

GBM, Green Innovation, Policy and GBMI. The final chapter will be a conclusive synopsis of the thesis, with some reflective questions and suggestions for further research.

Chapter 2: Literature Review

2.1 Chapter Objective

The objective of this chapter is to provide a description of some of the main notions relating to the overall understanding of GBMI and therewith GBMs. These are; the 'Green' Concept, Business Models, Innovation, Green Innovation, Business Model Innovation, Green Business Models, and Policy and Policy Makers.

The fields of 'Green', 'Business Models', and 'Innovation' form the creative derivative of Green Business Model Innovation and will therefore be presented and elaborated on first. Specifically, the notions of 'Business Model' and 'Innovation' are of particular interest, as they provide insights to the understanding of the core ideology of how businesses operate and thus how they are motivated. (Henriksen et al., 2012:A, B)

By connecting the idea of 'Green' with the aforementioned notions, the opportunity to broadly describe the mechanisms and challenges related to greening businesses, the value chain, and society more generally from an organizational perspective is created, developing insights to the fields of Business Model Innovation, Green Innovation, and Green Business Models. An understanding of these areas of business is considered of high importance for both companies and policy makers if they are to support long-term sustainable growth (Henriksen et al., 2012:B; FORA, 2009). Therefore they are also presented here.

It is essential to note that the descriptions developed throughout this chapter are synthesized from various literature reviews and academic fields of study, but do not form absolute definitions or classifications. Each notion will be viewed and elaborated on individually.

2.2 The 'Green' Concept

As mentioned in the introduction, it is becoming increasingly recognized that a major global green transition is needed to preserve the long-term growth of the economy, while simultaneously providing protection for the environment and our natural resources. In this regard, 'green' is a term that is becoming increasingly popular, while referring to a vast variety of elements. It has been interpreted in many ways by various people and organizations, and has often been undermined as a marketing tool with little – if any – substance behind it. (Ernst & Young, 2008; Henriksen et al., 2012:B)

Regardless, the basic idea of green business, namely a business with focus on sustainability in both environmental and resource matters, is understood and widely accepted by most organizations and customers. Though the level of application might vary, the value of labelling a business as green is apparent and cannot be disregarded. (Ernst & Young, 2008, Porter & van der Linde, 1995)

Adopting green practises is often based on a good business sense (Ernst & Young, 2008). As exemplified by Chen (2008), and mentioned previously, Porter et al (1995) claim that firms which pioneer in green innovation will be in a position to gain the first mover advantage. This will subsequently allow them to charge higher prices for their green products, while simultaneously gain a better image, be able to develop and dwell into new markets, increase productivity, while reducing production waste to a minimum, and as a result gain a competitive advantage through enhanced corporate competitiveness.

Green business and the subsequent environmental markets are therefore much more than simply environmental goods and services; they form opportunities for business (Ernst & Young, 2008; quoting the CEMEP report; Henriksen et al., 2012:B; FORA, 2009). A move towards a greener, more environmentally conscious approach will result in the materialization of new technologies and innovations, which consequently will lead to non-technological changes in the form of new greener business models, products and services, economic sectors, and whole new industries and markets (Chen, 2008; Ernst & Young, 2008).

2.2.1 Basic Conceptions

For the above outcomes to become a reality, however, four notions must first be considered by the organization; namely the green economy, green growth, eco-innovation, and sustainability. These four terms devise the foundation for a common conceptualization of what is implied by green business and will be introduced next.

Green Economy

To begin with, the definition of the concept of green economy, has gained various definitions over the years. Nevertheless, the most widely recognized one is provided by UNEP, and is quoted in Henriksen et al. (2012:B):

> "*A Green Economy can be defined as an economy that results in improved human well-being and reduced inequalities over the long term, while not exposing future generations to significant environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one that is low carbon, resource efficient and socially inclusive.*"
>
> (Henriksen et al., 2012:B, pp. 4)

Hence, a green economy looks at a more sustainable future, with particular focus on the environment and people's well being. Without such an economic outlook, the establishment of a green business, and therewith GBMI and GBMs, seems improbable. (OECD, 2011:A, B)

Green Growth

If we assume that a green economy is recognized, it is believed that one of the results will be the promotion of green growth. Such an outcome will in turn further promote the idea of a green economy and vice versa.

Green growth refers to maximizing economic growth in a sustainable manner when natural resources are included. In other words, green growth is achieved by an organization when it uses fewer natural assets to grow, develop and gain a competitive advantage, consequently leading towards a more sustainable outcome. As Henriksen et al. (2012:B) state, "*green growth is about maximizing economic growth and development while avoiding unsustainable pressure on the quality and quantity of natural resources. Green growth is also about harnessing the growth potential that arises from transiting towards a green economy*." (pp. 5). Once more, if there is a

lack of green growth, then green business cannot develop. (FORA, 2009; OECD, 2011:A, B; Henriksen et al., 2012:B)

Eco-innovation

With the establishment of green growth and a green economy it is believed that eco-innovation will be enhanced, which looks at innovations that decrease the negative influence on the environment. Similarly, eco-innovations will also lead to the promotion of green growth and boost the green economy. Eco-innovation is thus defined as:

> "*Activities that produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air, soil, as well as problems related to waste, noise and ecosystems. This includes technologies, products, and services that reduce environmental risk and minimize pollution*." (Henriksen et al., 2012:B, pp. 6)

Eco-innovation looks at both technological, as well as non-technological alterations, which are more commonly referred to as incremental and radical innovations. Incremental innovations focus on the relative decoupling of natural resources (e.g. development of green products and services, emission reduction etc.), while radical innovations focus on making complete decoupling possible (e.g. GBMI and GBMs). It also has a focus on both economic, as well as environmental benefits, which is significant when it comes to development of new, green BMs (more about this in segment 2.7.2). (Henriksen et al., 2012:B; OECD, 2011:A, B)

Thus, eco-innovation can be said to increase levels of sustainability and enable green growth by developing incremental innovations to support radical, non-technological ones (and reverse). Without the creation of eco-innovations, it is believed that green processes would eventually come to a standstill. (OECD, 2011:A, B)

Sustainability

Finally there is the notion of sustainability, which is key in order to fully conceptualize and define the idea of green business. As a concept, it bears some similarities with the notion of green growth, as it refers to the "*development which meets the needs of the present without compromising the ability of future generations to meet their own needs*" (Drexhage & Murphy, 2010, pp. 2)

Just like the previous concepts, sustainability directly relates to them, as it both affects and is affected by these terms. However, sustainability also focuses on natural, social, as well as economic capital and their complex interconnections, all of which are important criteria that a firm must meet if it wants to become fully and truly sustainable. (Drexhage & Murphy, 2010)

Based on the above, the notion of green business is described as the field in which there are "*businesses that, across the whole economy, have made efforts to introduce low-carbon, resource-efficient, and/or re-manufactured products, processes, services and business models, which allow them to operate and deliver in a significantly more sustainable way than their closest competitors*" (Ernst & Young, 2008, pp. 4). The choice of this definition has to do with the fact that it encompasses the idea of a process or business model change in order to achieve sustainable outcomes.

2.3 Business Models

The Business Model (BM), in its essence, explains how a company does its business (Henriksen et al, 2012:B). Together with the concept of innovation, it provides insights as to how businesses operate and therefore how they are motivated, and has been essential to trading and economic behaviour for centuries (Teece, 2010).

However, as an idea, it only became prevalent with the rise of the Internet in the mid 1990's. Since then it has been gathering significant momentum, forming one of the most widely used business terms in board rooms, by organizational managers, consultants and analysts. (Baden-Fuller & Morgan, 2010; Zott et al., 2010)

Though the focus of the BM concept is thought to be of high value with regard to this paper, "*since it offers an opportunity to understand the mechanisms that are at the centre of how businesses operate GBMI*" (Henriksen et al., 2012:B, pp. III), it remains a rather ambiguous term, as it is often studied without being defined and has therefore a plethora of uses. Table 1 presents some of the many definitions of BMs that one can retrieve when going through the related academic literature.

Author(s)	Definition
Amit & Zott; 2001	"A business model depicts the design of transaction content, structure, and governance so as to create value through exploitation of new business opportunities." (As found in: Henriksen et al, 2012:B, pp. 39)
Baden-Fuller & Morgan; 2010	"[The] role of business models is to provide a set of generic level descriptors of how a firm organizes itself to create and distribute value in a profitable manner." (pp. 157)
Margretta; 2002	Business models are "stories that explain how enterprises work. A good business model answers Peter Drucker's age-old question: Who is the customer? And what does the customer value? It also answers the fundamental questions every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?" (pp. 87)
Ostenwalder et al.; 2005	"A conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value relationship capital, to create profitable and sustainable revenue streams." (As found in:

	Henriksen et al, 2012:B, pp. 39)
Teece; 2010	"A business model articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value." (pp. 179)

Table 1: Selected business model definitions by various authors.

2.3.1 What They Are Not

As can be seen from the definitions presented in Table 1, there appears to be an absence of a commonly accepted terminology for what a BM is and what it entails. Instead, as Zott et al. (2010) demonstrate, through '*attempts at conceptual refinement*' (pp.18), how scholars have been able to contribute to the clarification of what BMs are *not*.

Firstly, they emphasize that BM value is created through complex and interconnected relationships and activities amongst stakeholders. This means that BMs do not create value in a linear fashion, (e.g. from suppliers to the firm and from the firm to the customers). (Zott et al., 2010)

Secondly, a BM is not synonymous with a firm's strategy, as it is more generic (Zott et al., 2010). The BM is about the benefit the firm will deliver to its customers, how it will do this organizationally, and how it will capture some of that value in order to create a profit (Teece, 2010). In other words, it describes how the pieces of the business fit together, namely how the company is commencing its trade. On the other hand, a competitive strategy has a focus on how you will outperform your rivals, usually through differentiation (e.g. focus on which customers to serve and why, which products the firm should offer, which services it should have, etc.) (Margretta, 2002).

Thirdly and lastly, the BM cannot be condensed to concerns regarding the internal organization of a company. The reason for this is that it emphasizes the importance of activities regarding the needs of customers (external factors), therewith having the potential to become a source of competitive advantage. (Zott et al., 2010)

2.3.2 Common Themes

Beyond demonstration of what BMs are not, Zott et al. (2010) have also been able to establish through their review of the BM literature, some common themes amongst them. To begin with, they see BMs as new units of analysis that are positioned between firm and network levels, embodying a holistic perspective on how firms do business, with an emphasis on activities, and insights on value creation and not just focus on value capture.

BMs also require learning and adjustment, and are often replaced over time, as what is right for a given organization might not be apparent at first or might change over time. The development of BMs can therefore be seen as a learning process, undergoing trial and error in order to be optimised, while always requiring adaptation. For example, with the emergence of a green economy, eco-innovation and green growth, a more green oriented business model might become appropriate for a firm. (Zott et al., 2010; Bisgaard et al., 2012; Baden-Fuller & Morgan, 2010)

Another significant element of BMs is that, in and of themselves, they are unable to create a competitive advantage regardless of how successful they may be, as they are often quite transparent and therefore easy to imitate by competitors (Teece, 2010). As mentioned previously, a business model is more generic than a business strategy, requiring their combination to protect any competitive advantage presented by the business model. Strategy analysis is thus pivotal in designing a competitive and sustainable BM. (Zott et al., 2010; Baden-Fuller & Morgan, 2010; Bisgaard et al., 2012)

2.4.3 Defining the Notion

From the above we now know that BMs are complex, we know what they do not entail, and we have become aware of some common themes amongst them. Though ambiguous (and not a universally accepted definition), we define the notion, in this paper, as "*how value is created for the customers and how value is captured for the company and its stakeholders*" (Henriksen et al., 2012:B, pp. 14). More than this, we conceive BMs as vehicles for innovation, as well as a source of it (Zott et al., 2010).

The reason for choosing the above designation is because it is quite fitting with the purpose of the paper, as it closely relates BMs with innovation. It also encapsulates the essence of what some of the most influential authors on the field of BMs have described the concept to be (Margretta, 2002; Zott et al., 2010; Baden-Fuller & Morgan, 2010; Teece, 2010).

2.3.4 Summary

To recapitulate then, the term BM, though widely used, remains ambiguous having various definitions. It is a complex and rather interconnected concept, describing how the pieces of the business fit together. Though it is not the same as a firm's strategy, it must be combined with one to be successful.

The development of BMs is a learning process with a focus on both internal and external organizational matters, allowing the company to gain a good overview of how it creates and captures value while understanding what can advantageously be changed to keep its competitive lead in the market. It is defined in this context as "*how value is created for the customers and how value is captured for the company and its stakeholders*" (Henriksen et al., 2012:B, pp. 14).

2.4 Innovation

In a similar way as a BM, innovation, although it is essential for the successful long-term growth of any organization, it cannot guarantee business success by itself either. However, the capturing of value from innovation is a vital element of the design of BMs. Innovation requires the coupling of a good business model design and implementation with a careful analysis in order to identify the 'go to market' and 'capturing value' strategies. Innovations can then be said to form another means by which organizations create and/or maintain a competitive advantage and become more sustainable as a result through learning and building knowledge. (Teece, 2010; Baden-Fuller & Morgan, 2010).

More than a pairing with a compatible BM and strategy though, there is a need for innovation to be backed up by government interventions, in the form of policies and regulations. This is to be able to form the right conditions and provide the necessary support and protection for sustainable business success. Also, the concept of innovation is a dynamic process of high complexity, meaning that without the right environmental conditions it cannot succeed. (Teece, 2010; OECD, 2009).

This section will proceed to determine what the definition of innovation is and what it entails as a term from a business perspective. The following section will instead provide the specific form of innovation that is in focus in this thesis.

2.4.1 Defining the Notion

Once more, we are dealing with a concept that is used and discussed by many business disciplines, and therefore has a variety of definitions that align with the dominant paradigm of each field. The only general perception that exists within businesses is that firms that fail to innovate and develop the products desired by their customers will stagnate, which makes innovation an essential part of virtually all the activities the firm undertakes. (Ireland et al., 2009)

In their book "*The Management of Strategy (Concepts)*" (2009) Ireland et al. propose a definition of innovation based on the words of Peter Drucker. He states that "*innovation is the specific function of entrepreneurship, whether in an existing business, a public service institution, or a new venture started by a lone individual."* (pp. 370). Furthermore, Drucker claims that innovation is the means by which one "*either creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth.*" (pp. 370).

An alternative view of innovation is that of it being comprised of three types of activity; namely invention, innovation, and imitation (Ireland et al., 2009 quoting Schumpeter's *The Theory of Economic Development*). Here, invention is defined as the act of creating or developing new products or processes. Innovation is seen as the creation of a commercial product from the invention. That implies that an invention brings something new into existence, whereas an innovation brings something new into use. Finally, imitation refers to the adoption of a similar innovation by other firms, which then suggests the need for a new invention and further innovation again. (Ireland et al., 2009)

2.4.2 Types of Innovation

The above view of innovation as developed by Schumpeter, namely that innovation is constructed by three types of activity, leads to the suggestion that innovation can be distinguished between types. Various such categorizations exist in the academic literature, a few of which are presented next.

Pohle and Chapman (2006) discuss a framework, which classifies three innovation types. Firstly, they identify business model innovation, which focuses on innovation in the structure and/or the financial aspect of the business. Secondly, they mention operational innovation, which aims at improving the effectiveness and efficiency of the organizations core functions and processes. Finally, they bring up products, services, and markets innovation, which refer to alterations

applied to products, services, or market activities. These three types are described as vital, equally important, and inseparable from one another when undertaking innovative processes.

Along a similar frame, other scholars (Lam, 2004; Baranano, 2003; Ireland et al., 2009; Chesbrough 2010; Kline & Rosenberg, 1986) have implied that innovation is distinguished in only two types. These two means of analysis have been identified as organizational and technological innovation.

Organizational innovation refers to the creation or integration of an idea or concept that is indeed new to a firm (e.g. integration of a new business model, changes in a firms organizational structure, new managerial techniques etc.). It combines so to speak what Pohle & Chapman define as operational and business model innovation into one (Lam, 2004; Baranano, 2003). In other words, it is the introduction of momentous alterations in the organizational structure of the firm and/or the implementation of sustainable new managerial techniques – there is a management outlook (Baranano, 2003). Technological innovation instead has a more strategic focus and refers to the development of new technological products and services (Kline & Rosenberg, 1986; Chesbrough, 2010).

The distinction between these two types of innovation becomes essential because, as mentioned previously, a business model cannot be considered to be synonymous with a firm's strategy (Zott et al., 2010). In much the same way, innovation on an organizational level (which can include integration of new business models, organizational changes etc.) is very different from innovation on a strategic level (e.g. here the focus is on which new customers to serve and why, which new products the firm should offer, which new services to develop, etc.). These two innovation types are not mutually exclusive however, as the innovation process (whether it has an organizational/managerial or technological/strategic focus) will have an effect on them both. (Lam, 2004; Baranano, 2003; Ireland et al., 2009; Chesbrough 2010; Kline & Rosenberg, 1986)

With regard to this thesis, the second view is adopted, which distinguishes between two types of innovation - organizational and technological. In addition, the primary focus is on the organizational side of things, such as the innovation of business models and the creation and integration of green business models.

2.4.3 Innovation, Change and Uncertainty

Innovation is also often viewed as having the ability to shape and manage multiple capabilities (Ireland et al., 2009). Organizations that have this innovative capability are therefore able to integrate key competences and resources in order to successfully encourage innovation, helping the firm to play a significant part in the shaping of the future of the industries they are in.

Consequently, innovation cannot be viewed as a simple and linear process. Instead it is dynamic and complex, as it often takes place in turbulent and highly competitive environments. Elaborating on this matter, Kline and Rosenberg (1986) go on to describe the process as follows:

"*Innovation is complex, uncertain, somewhat disorderly and subject to changes of many sorts. Innovation is also difficult to measure and demands close coordination of adequate technical knowledge and excellent market judgment in order to satisfy economic, technological, and other types of constraints – all simultaneously. The process of innovation must be viewed as a series of changes in a complete system not only of hardware, but also of market environment, production facilities and knowledge, and the social contexts of the innovation organization.*" (pp.275)

The outcome is that innovation is regarded as a process of change. This must further imply that innovation and change are inherently linked.

The concern that surfaces with this implication is that change is considered a risky activity to undertake, as it is filled with uncertainty. Uncertainty in turn, if not managed appropriately, can lead to negative outcomes and compromise success (Palmer et al., 2009). Uncertainty is here defined as; the implication of the creation of something new, where the new contains uncertain elements, which one cannot comprehend (at least not in the initial stages). At the same time, uncertainty forms the central dimension that organizes innovation, as it creates conditions under which it is needed. (Kline & Rosenberg, 1986, OECD, 2011:B; OECD, 2009)

The degree of uncertainty an organization has to manage depends on whether it acts in a revolutionary (in response to challenges, threats, or instabilities in the environment occurring only when necessary) or evolutionary (systematic and extensive innovation happens continuously) manner to innovation. In any case, dealing with uncertainty can help create an understanding of why various criteria apply and different problems occur during innovation at different times in the production cycle of a product or process. (Palmer et al., 2009)

Uncertainty, in the change process resulting from innovation, can also act as a limitation instead of a driving force. Managers for example might resist innovation due to the vagueness change brings about, as company value could be threatened. Innovation may also cause systemic failures that prevent the flow of knowledge and technology, while reducing efficiency leading to market failures. Lack of market demand is another limitation of innovation, as it will cause insufficient incentives for companies to invest in it. Therefore, innovation in all its formats (process innovation, eco-innovation, green innovation etc.) needs to be supported by government interventions, for example in the form of policies, which can set the right framework conditions and provide substantial support for successful research and development of businesses. (Palmer et al., 2009; Kline & Rosenberg, 1986; OECD, 2011:B; OECD, 2009)

Disregarding any distinction, innovation still remains a process whose effects are rather hard to measure. Yet, it can be concluded that it will also be a very important driver of the transition towards green growth, the establishment of a green economy and the enhancement of sustainability. Without innovation "*it will be very difficult and very costly to achieve the transformation to a greener economy… new ideas, new entrepreneurs and new business models, thus contributing to the establishment of new markets… Innovation is therefore key in enabling green and growth to go hand in hand.*" (OECD, 2011:B, pp. 124).

2.4.4 Summary

To sum up, innovation, though a complex and multi-faceted term, is described as *"the specific function of entrepreneurship, whether in an existing business, a public service institution, or a new venture started by a lone individual...* [which] *either creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth.*" (Ireland et al., 2009, pp. 370).

As a concept it is often distinguished in various types, i.e. organizational and technological innovation. For the needs of this thesis, the organizational point of view will be primarily considered and discussed.

Finally, innovation is described as a process of change, meaning that it is observed as a sequence of events unfolding over time inherently linked with transformation and consequently elements

of uncertainty. Nevertheless, it is considered a vital driver of the transition towards green growth, green economical outcomes and consequently development of GBMs and GBMI.

2.5 Green Innovation

Having explored the field of innovation, defined the term, and distinguished between the various types that exist, we now move into a more specific form of it; namely that of green innovation. Green innovation is identified as the result of innovation development specifically within the green business sector. It therefore has a sustainable outlook and is, like the notion of innovation itself, a driving force for the creation of GBMI and consequently GBMs. But how is green innovation defined and what are the drivers behind it? (Chen, 2008:B; OECD, 2009)

2.5.1 Defining the Notion

Referring back to the notion of eco-innovation in The 'Green' Concept segment, it becomes obvious that the designation carries significant relevance to the idea of green innovation considered in this context. However, there is one important limitation: eco-innovation is not limited to just intentional environmental innovations. Rather it also includes unintended forms too. This suggests that almost all innovating firms – regardless of intention or level of 'greenness' - can be seen as eco-innovators. (Henriksen et al., 2012:B; OECD, 2011:A)

Such a definition can cloud the view of what green business and the related innovations are, minimizing the chances for a green economy, green growth and sustainable outcomes. In turn, this can damage true green innovation and therewith development of GBMs through green oriented business model innovation. For this reason, green innovation is perceived as the *intentional* creation of new or the significant improvement of existing green products or processes that reduce environmental impacts and/or reduce the use of resources throughout the lifecycle of related activities. Green innovation, in other words, forms a premeditated type of eco-innovation, embedded under the general field of innovation. (Chen, 2008:A, B; OECD, 2011:A; OECD, 2009)

Another important dimension of green innovation is that it does not aim to spur new technologies continuously, but instead it aims at accelerating the environmental performance improvement through innovative means. That is to say that the aspiration is not as much to stimulate

technological innovation, as it is to enhance organizational innovation, which in turn will assure that technologies and processes are diffused on time to deliver a certain level of environmental performance. The organizational innovation outlook of green innovation further supports the need for the understanding and the future development of more GBM frameworks. (OECD, 2011:A)

2.5.2 Forces, Motivations and Drivers

Aside from the complexity surrounding the definition of green innovation, various opinions exist regarding the forces, motivations, and drivers of it. These factors are very important to consider, as they form the motivation behind what is believed to be an essential element leading to GBMI and the creation of GBMs. Some of the views of what pushes and affects green innovations are considered here.

Chen (2008:B) raises the opinion that two primary forces drive a firm to engage in green innovation. These forces are defined as international regulations of environmental protection (e.g. the Brundtland Report, the Kyoto Protocol etc.) and the environmental consciousness of the firms' customers.

Noci & Verganti (1999) on the other hand, though acknowledging the forces Chen (2008:B) identified, argue that by themselves these drivers cannot trigger green innovation. Rather, for green innovation to occur, the whole value chain must be concerned, turning the focus on the product, as well as on the process (e.g. establishment of appropriate green oriented BMs).

Finally, Arundel & Kemp (2009) go on to propose five drivers of eco-innovation, which can be assumed to be very similar to those of green innovation. These drivers refer to regulations, demands from the users, the potential of capturing new markets, cost reduction, and organizational image. In similar fashion, the OECD (2009) has concluded that eco-innovation, in order to succeed "*needs government interventions that set the right framework conditions and provide enough support for successful research and business development*" (pp. 182).

The influence of government interventions through policies and regulations on the field of green innovation and subsequently GBMI, which seems to be considered by all of the above views presented, will be examined later, under segment 2.8.

2.5.3 Summary

To summarize, green innovation, though it remains an obscure term, is defined as the *intentional* creation of new or the significant improvement of existing green products or processes that reduce environmental impacts and/or reduce the use of resources throughout the lifecycle of related activities. However, it does not aim at creating innovations as such, but rather there is a focus on improving environmental performance through innovative means.

Additionally, a number of forces, motivations, and drivers exist for green innovation. These are important to consider and vary according to the area of focus, the individual study, and the author. The main ones, however, are thought to be government intervention and policy, and economic and market benefits.

2.6 Business Model Innovation

With the emergence of green innovation (and market deviations more generally), businesses that aim at retaining or further strengthening their market position have to continuously reconsider and adapt their business models. (FORA, 2009)

Innovation, as already stated, is vital for all firms and organizations that wish to remain competitive, or being at the forefront of competition while ensuring sustainability of their processes. However, such innovations result in alterations in the market that can quickly affect a company's business model, making it obsolete or at least minimizing its productivity. For that reason, and in order to be able to discuss how an organization can green its business model through innovation, it is essential to first introduce and discuss the notion of Business Model Innovation (BMI). (Bisgaard et al., 2012; Sosna et al., 2010; Comes & Berniker, 2008, Teece, 2010)

2.6.1 Why is BMI Necessary?

It is a commonality that companies rarely succeed again and again on a commercial basis by using the same model. This is because of the said changes in industries and markets, which in turn create new challenges that must be dealt with. Thus, to remain competitive, firms must focus on identifying the limitations of their existing BMs and subsequently challenge them, re-think them or re-invent them. (Chesbrough, 2010; Comes & Berniker, 2008; Henriksen et al., 2012:B)

When executed correctly, BMI can be tremendously beneficial, as it can create new markets or transform existing ones. It is basically seen as an attempt to improve the building blocks of the existing business model by finding new ways to innovate beyond product or process innovation, while minimizing uncertainty to become more sustainable. (Comes & Berniker, 2008; Henriksen et al., 2012:A)

It is important to note that BMI is not seen as a matter of superior foresight on a beforehand. Instead, it is the result of environmental alterations, which can either form threats to the firm or opportunities. It is therefore more accurate to view BMI as a process that must undergo trial and error, by being implemented as an initial experiment, before being constantly revised, adapted, and fine-tuned. (Chesbrough, 2010; Sosna et al., 2010)

2.6.2 Defining the Notion

While many innovations result in smaller, departmental changes and adjustments in a firm, BMI can result in complete transformations (e.g. re-thinking value proposition to customers, finding new ways to seize new market areas, creating new producer-consumer relationships, employing new profit formulas, and recreating activities, resources and partnerships). Usually, the changes taking place in a BM are identified in one of the following four forms:

- Modification through small and progressive alterations;
- Re-design materialized in important changes;
- Alternative building blocks, fulfilling the same function or acting as replacements for the old ones;
- Creation of new and innovative ideas. (Henriksen et al., 2012:B)

Regardless of the extent of the change that is taking place, the aim of BMI is to answer two questions: What value is the company providing to its customer? And how does providing this value profit the firm? In this sense, it can be seen as the junction of "*a new profit model and a new customer value proposition, unified to create an entirely new type of market player*" (Comes & Berniker, 2008, pp.78). The benefits of such innovation are cost reduction, increased strategic flexibility, focus on specialization, rapid exploration of new markets and/or product opportunities, increased sustainability, and reduction of risk and capital investment.

Companies, which have a focus on BMI, tend to enjoy a significant operating margin growth when compared to other kinds of innovation and companies who have managed to just sustain theirs (Pohle & Chapman, 2006). However, the challenge for the designers of the BM is to identify the key relationships and core components that describe it before moving onto its innovation (Lindgren & Taran, 2010).

For the purposes of this paper, BMI follows the definition developed by professor Mahadevan (2004), as presented by Henriksen et al. (2012) in their report titled '*Green Business Model Innovation: Conceptualization Report'*. BMI is therefore defined as what "*enables a firm to uniquely deploy available alternatives with respect to product, technology, process and markets with a view to create new value propositions and appropriate value arising out of the competitive advantage.*" (pp. 17). More than this, the focus is explicitly on BMI with a green outlook, which has been referred to as GBMI and which leads to the establishment of GBMs. It can therefore be said, that GBMI, much like green innovation with regard to the general field of innovation, forms a specific type of BMI.

2.7 Green Business Models

Recognizing that organizations are increasingly aware of the need to green their own business or value chain to increase both short and long-term competitiveness and create new markets, has resulted in them seeking specific innovations to their BMs by changing to greener inputs. Whether it is by selling greener product and services, or shifting to greener consumption configurations and practises throughout the entire life cycle, these companies are greening the way they are conducting their business. The result of such BMI is the creation of new and innovative models, with environmental benefits and economic viability, referred to as Green Business Models. (Bisgaard, et al., 2012; OECD, 2009; OECD, 2011:A, B; FORA, 2009)

2.7.1 Defining the Notion

The literature concerning GBMs, like so many of these other 'green' related terms and frameworks that have been considered so far, is quite limited. This is primarily because the field of environmental sustainability and green business are still very recent and therefore underexplored. (FORA, 2009)

Nonetheless, Lindgren & Taran (2010) have taken a futuristic outlook into the development of green oriented business models and claim that the backbone that forms such a BM is information and communication technologies, which subsequently lead to innovation. GBMs can therefore be seen as emerging BMs "*able to open new possibilities for the development of green-based technology developments, and business model innovations*" (pp. 234), while avoiding the exposure of future generations to environmental risks and/or resource scarcities. (Henriksen et al., 2012:B; Lindgren & Taran, 2010; FORA, 2009)

Hence, GBMs are defined in FORA's (2009) green paper as "*business models which support the development of products and services (systems) with environmental benefits, reduce resource use/waste and which are economic viable*" (pp. 8). They are, so to speak, emerging BMs with a lower environmental impact than current, more traditional ones, caused by the development and enhancement of the field of green business and green innovations. (Lindgren & Taran, 2010; FORA, 2009; Henriksen et al., 2012:B)

The general perception is that the more parts of a BM which are greened, and the more severely a green change is taking place within the individual parts of the BM, the greener the innovation of the BM is. A greener BMI in turn, results in the formation of a more substantial and sustainable GBM. (Henriksen et al., 2012:A, B; Bisgaard et al., 2012)

2.7.2 Requirements for Success

Business sense, however, dictates that sustainability can only become a vital part of a company's BM if it leads to creation of additional value for the stakeholders involved, in the form of maintainable revenue streams or reduction of future costs. GBMs are no exception to this rule, as they must be both economically as well as environmentally viable. (Henriksen et al., 2012; OECD, 2009)

Eco-innovation (look under The 'Green' Concept) therefore becomes a fitting idea in explaining the rational of GBMs, as it is a term that considers both economic and environmental benefits. It addresses how an organization changes the logic of how it offers value to customers, while preserving the environment through changes in the entire life cycle of the business.

Eco-innovation, in other words, has the ability to transform markets, companies and societies by devising BMs that encourage green products, services and processes, while reducing use/waste

and remaining profitable. It supports green growth and enables the establishment of a green economy, which results in further green innovations and development. This green-oriented process of improvement leads to the need for appropriate BMs through the method of BMI. The outcome is the formation of BMs with a green focus (GBMs). (Bisgaard et al., 2012; Henriksen et al., 2012:B; OECD, 2011:A; OECD, 2009)

More than this though, for GBMs to succeed they must be commercially successful. This implies that they must appeal to the customer. They must also be future ready, meaning conscious of emerging trends and markets and therefore ready for dynamic changes. Finally, GBMs must be part of a sustainable society to thrive, where there is focus on matters such as green economy, green growth and green innovation, while supported by appropriate policies and regulations. This is vital, as the lack of a society willing to go green implies the lack of a market opportunity for organizations. (Henriksen et al., 2012:B; OECD, 2011:A)

2.7.3 Types of Green Business Models

Unlike classic green businesses, which tend to be focused on green products solely (e.g. products which are more energy efficient, are produced with less material, use less energy etc.), GBMs shift the core business strategy of a firm from selling and developing green products to selling service systems which includes the product (greening of processes). That is to say, a GBM has a sustainable focus on how the company conducts its entire business. (Henriksen et al., 2012:A, B; Bisgaard et al., 2012; FORA, 2009)

The greening of processes category is of particular interest when discussing BMs, as the aim is to show "*how value is captured for the company and its stakeholders*" (Henriksen et al., 2012:B, pp. 14). It has two main models of creating greener businesses, namely incentive and life cycle models. Incentive models refer to the greening of one's value chain by creating incentives for customers to use resources in a more effective manner. Life cycle models on the other hand focus on the greening of parts of the value chain. (Henriksen et al., 2012:A, B; Bisgaard et al., 2012; FORA, 2009)

Examples of both types of these innovative GBMs can be seen in the Appendix (Fig. 1 & Fig. 2 respectively).

2.7.4 Green Business Model Barriers

While GBMs become increasingly important for the further greening of businesses and the enhancement of a sustainable future, it is a path that is often met with a range of diverse challenges. Some of the most significant ones are mentioned here.

Often, the implementation of GBMs requires large investments, where the payback time is long and there is uncertainty about the actual savings that will be achieved by customers. Also, there may be resistance to the newly created sustainable BM, as employees and customers can have a more traditional mind-set to business. There may also be unwillingness by other companies in the value chain to get involved in the process, as there is often a need for a change and sharing of information and materials. Further, lack of competencies and knowledge by stakeholders can form another obstacle to the successful implementation of GBMs. More examples of barriers can be seen in the Appendix (Fig. 3 & 4). (Henriksen et al., 2012:A)

The above key barriers can be dealt with through the development and implementation of widespread policies and regulations (Henriksen et al., 2012:A; Bisgaard et al., 2012). This will be discussed in the next segment.

2.7.5 Summary

Conclusively, GBMs are defined as "*business models which support the development of products and services (systems) with environmental benefits, reduce resource use/waste and which are economic viable*" (FORA, 2009, pp. 8), while avoiding exposure of future generations to environmental risks and/or resource scarcities. Though it is a term that is uncommon in business literature, it is gaining increasing significance, focusing on full-cycle solutions (Appendix, Fig. 1 and 2) rather than simply the development and/or improvement of green products.

For the notion of GBM to become successful, it must be both economically as well as environmentally viable. It is therefore beneficial to view it as the result of eco-innovation, as it is a term that considers both factors (the economy and environment). GBMs must also be commercially successful, future ready and part of a sustainable society with the support of policy. Their development is therefore dependent on a green economy and green growth.

Furthermore, GBMs can be distinguished in two main categories; greening of products and services, and greening of processes. The second category is of particular interest for this thesis.

Greening of processes is additionally distinguished in two principal models, known as incentive and life cycle models.

Finally, as with the creation and implementation of any new BM, GBMs are faced with key barriers. These, however, can be dealt with through the help of relevant policies and regulations.

2.8 Policies and Policy Makers

When discussing the role of policy with regard to the green innovation of BMs, it becomes obvious, through the relevant literature, that it plays a significant role in supporting and enhancing green innovation, green growth and the development of a green economy (Bisgaard et al., 2012; Henriksen et al., 2012:A; FORA, 2009; OECD, 2009; OECD, 2011:A, B). This segment will attempt to provide evidence for this claim, by presenting the function of policy and policy makers in green business, as well as existing and future policies targeting GBMI.

2.8.1 The Function of Policy and Policy Makers in 'Green' Business

The OECD (2009) explicitly states, "*Like general innovation, eco-innovation needs government interventions that set the right framework conditions and provide enough support for successful research and business development*" (pp. 182). It is only through such support that green growth can be achieved and GBMI frameworks can be further developed, as "*innovation benefits from having stable and predictable policy signals*" (OECD, 2011:B, pp. 54). (Bisgaard et al., 2012)

More specifically, policy makers must be in a position to assess whether new sustainable innovations are to be left to the market or whether policies are needed to support them, and in that case, what these policies should look like. The reason for policy creation and intervention with the emerging innovations can be due to market failure in the case of a negative environment (help overcome barriers to commercialization), which in turn can lead to under-investments in eco-innovation, green growth and GBMI. (Bisgaard et al., 2012; Henriksen et al., 2012:A, FORA, 2009, OECD, 2011:B)

However, policy makers are not to interfere with the methods used by firms to reach their green targets. Instead, they are there to set goals and allocate resources that can be used by organizations in their pursuit of green transition. Dialog between public and private stakeholders can also develop new ways for green growth, while enhancing GBMs and their innovation. More

than this, constant monitoring and evaluation of any implemented policies to assure their effectiveness and efficiency, while gaining benefits from further developments, might additionally be used. (Bisgaard et al., 2012; OECD, 2011:B)

Furthermore, the policies developed have to lead to the desired effects. The focus should be on performance rather than specific technologies and cost recovery, and the criteria for selection must be clear. In an increasingly globalised society, the challenge becomes even greater for policy makers, as national policies can rarely stand alone, but instead will have to intertwine with policies in other nations and regions, and implement regulations that are as widespread as possible. (Bisgaard et al., 2012; Henriksen et al., 2012:A; OECD, 2011:B)

More than this, they have to be developed in several layers, focusing on the macro as well as the micro level, while creating both growth and environmental perseverance. It is also important to understand what types of companies are being addressed by the policies created, without neglecting the fact that innovation can emerge from anywhere. This means that policy must foster innovation while also embracing competition and allowing new firms with new ideas to enter the market. (Bisgaard et al., 2012; OECD, 2011:B; FORA, 2009)

Finally, policy creation and intervention can deal with potential systemic failures disrupting the flow of technology and knowledge. If not considered, these disruptions could result in a reduction in the effectiveness and success of a given innovation, compromising therewith again the potential for GBMI. (Bisgaard et al., 2012)

From all this, it becomes safe to assume that policies and policy makers have a vital role in the creation of GBMs, as they must provide support to organizations transforming from traditional BMs to GBMs. They do this by enhancing the means and opportunities that lead to eco-innovations – without which a green transformation will be very difficult and costly - while backing green growth, and allowing therewith the development of a green economy, all of which are essential elements for the establishment of green business and successively GBMI. (FORA, 2009; OECD, 2011:B; OECD, 2011:A, B; Bisgaard et al., 2012)

2.8.2 Existing and Future Policies Targeting Green BMI

Though rather limited, the literature surrounding policies with a sustainable outlook does contain some existing examples within the business world. Divided into policies targeting incentive

models and ones targeting life cycle models, the current policies identified supporting GBMI, can be seen in the Appendix, Fig. 5 & 6.

These existing policies help create a picture of where governmental focus has been placed so far in an attempt to support 'green' business, while also providing insights as to where no attempts have been made as of yet (e.g. Functional Sales and Green Supply Chain Management). The limited number of identified policies also helps explain why the GBM frameworks remain imperfect and why sustainability has yet to reach the heights the Brundtland Report and the Rio Convention in 1992 predicted. (Bisgaard et al., 2012; Henriksen et al., 2012:A; www.epa.gov)

Beyond the restricting number of existing policies in place, various recommendations to enhance policy impact and therewith reach higher levels of green business development have been provided through a number of recent reports and publications (Henriksen et al., 2012:A, B; FORA, 2009; Bisgaard et al., 2012; OECD 2009; OECD, 2011:A, B). Examples of such initiatives can be seen in the Appendix, Fig. 7.

It is important to take into consideration that any policies, regulations, legislations etc., whether they are already implemented or are to be applied in the future, will always be subject to re-evaluation and subsequent alterations. The reason for this is that policy, while playing a significant role with regard to green innovation, GBM innovation and development, and the green industry more generally, it is equally affected by these notions. In other words, the emergence of new GBMs or new green innovations will cause changes to the green business field and in result require adjustment of existing policies or creation of new ones to provide the adequate support. Thus, the relationship between policy and sustainable business can be described as dynamic, interrelated and co-dependent. (OECD, 2009; OECD, 2011:A, B; FORA, 2009; Bisgaard et al., 2012)

2.8.4 Summary

Policy and policy makers play a significant role with regard to the transformation of traditional BMs into GBMs. They must assess whether policies are at all needed, and assure that if they are that they lead to the desired effects, while avoiding interference with the methods used. Further, they must enhance dialog between public and private organizations, monitor and evaluate implemented policies, understand the type of companies that are being addressed, and make sure

that knowledge and technology flow is not disrupted by systemic failures. Finally, they must focus on performance heights, macro as well as micro levels, while allowing for competition and intertwining with policies in other nations and regions.

Though present policies targeting green business model innovation do exist, creating a picture of where focus has been placed in the past, not enough attention has yet been given to this business field. Therefore, new policies and regulations are required to support the idea of GBMI. Various such recommendations are provided by a number of recent green reports and publications.

Important to mention is also the fact that any policies, legislations, regulations etc. already implemented or which are to be applied in the future, will always be subject to re-evaluation and subsequent alterations. This is because changes and developments within the green field will always require adjustment of existing policies or creation of new ones to provide the adequate support, as sustainable business and policy are highly interrelated.

2.9 Main Findings of Chapter

To summarize, businesses which "*have made efforts to introduce low-carbon, resource-efficient, and/or re-manufactured products, processes, services and business models, which allow them to operate and deliver in a significantly more sustainable way than their closest competitors"* (Ernst & Young, 2008, pp. 4) are defined as 'green'. The notions of green economy, green growth, eco-innovation and sustainability form key elements of the concept of green business, and must be recognized by organizations if they are to achieve long-term sustainability.

Further, a company's BM is identified as "*how value is created for the customers and how value is captured for the company and its stakeholders*" (Henriksen et al., 2012:B, pp. 14). It remains a complex and ambiguous term, though widely used, and is branded as a learning process with a focus on both internal and external organizational matters, allowing the company to gain a good overview of how it creates and captures value while understanding what can advantageously be changed to keep its competitive advantage on the market.

The emergence of the green concept leads to innovation; a notion that, just like BMs, is essential for the long-term success of an organization. It is described as *"the specific function of entrepreneurship, whether in an existing business, a public service institution, or a new venture*

started by a lone individual... [which] *either creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth.*" (Ireland et al., 2009, pp. 370). It is often distinguished in various types and forms, and signifies a process of change linked with high levels of uncertainty.

One specific type of innovation, with high relevance to GBMs and GBMI, is green innovation. It differs from what has been defined as eco-innovation, as it is more specific and particularly describes the *intentional* creation of new or the significant improvement of existing green products or processes that reduce environmental impacts and/or reduce the use of resources throughout the lifecycle of related activities. Green innovation is endorsed by a number of forces, motivations and drivers in business, such as policy, image, environmental consciousness and capturing of new markets. Policy will be the main force of focus in this paper.

As green innovation emerges and brings about changes in the business environment, companies must also resort to innovation of their BMs to remain competitive and achieve sustainability. The notion of BMI is described as what "*enables a firm to uniquely deploy available alternatives with respect to product, technology, process and markets with a view to create new value propositions and appropriate value arising out of the competitive advantage.*" (Henriksen et al., 2012:B, pp. 17). In other words, it tries to answer two questions: What value is the company providing to its customer? And how does providing this value profit the firm?

BMI usually takes four forms (modification, re-design, alternative, and creation), and is a process that is often faced with various barriers to its success. A more specific form of BMI, is one that results from green innovations and takes place within the green business field. This is a process referred to as GBMI. It results in the transformation of an organizations' existing BM into a greener oriented one, namely a Green Business Model. In other words, GBMI is accomplished by combining current research from various areas of business to form new and up-to-date eco-focused and economically viable sustainable GBMs. The more parts of the business model that are changed with a resulting green effect, and the stronger a green change is taking place within the various parts of the BM, the greener the BMI and subsequently the higher the potential for the creation of radical green innovation.

GBMs are subsequently defined as "*business models which support the development of products and services (systems) with environmental benefits, reduce resource use/waste and which are economic viable*" (FORA, 2009, pp. 8). They can be distinguished in two main categories; greening of products and services, and greening of processes. Greening of processes is additionally distinguished in two principal models, known as incentive and life cycle models. As with traditional BMI, GBMs are faced with key barriers, which can be dealt with through the help of relevant policies and regulations.

Policies that aim to help green development, if they are at all needed, must assure that they lead to the desired effects, while not interfering with method used by organizations when attempting to become greener. They must also enhance dialog between public and private organizations, monitor and evaluate implemented policies, understand the type of companies that are being addressed, and make sure that knowledge and technology flow is not disrupted by systemic failures. Finally, they must focus on performance heights, macro as well as micro levels, while allowing for competition and intertwining with policies in other nations and regions. All such considerations will enable the overcoming of barriers found in the green industry, allowing therewith for the development of GBM frameworks.

Though policies and regulations targeting GBMI do already exist, it is safe to assume that more are needed. Various such recommendations have been made in the relevant literature. However, both existing and future policies will always need to be re-evaluated or altered, as changes and developments happen in the green sector. Green business and policy are therefore interrelated and co-dependent concepts.

A synopsis of all the definitions of the main terms used in the literature review can also be seen in the Appendix, Fig. 8.

2.10 A Model of Green Business Model Transformation

Based on the literary findings of this chapter, a model has been developed. The model aims to bring together the most significant elements of the literature review and consequently provide an illustration of how GBMs emerge from ordinary BMs and the role of policy and/or policy makers in this very process. In other words, it forms an indication of the various notions'

interrelations in the specific context of the GBM creation process. Therewith, an existing gap in the green and business model literature will hopefully be filled out, as no such model - to the knowledge of the author - has been developed before. The model can be seen below in Figure 1.

Furthermore, the purpose of this framework is also to be used as a valid response and indication with regard to the Research Question presented in the introduction. The empirical data collected (interviews from members of the case companies) will thereafter be used (in chapter 5) to create assumptions regarding its relevance, transferability and general validity, while also allow for the identification of any limitations and suggestions for further research.

At last, an important thing to note is that the link between 'Green Innovation' and 'Green Business Model Innovation', as seen in the figure below, does not intend to imply that every innovation of a green nature results in a BMI. For example, a firms' choice to adopt some more environmentally friendly undertakings (e.g. minimize use of paper, water, electricity etc.) or to take part in some limited green developments, might only be so in order to enhance their image and brand, but without any essential changes to how they create or capture value. Instead, the link between these the two titles attempts to show that if GBMI is undertaken in an organization, then it is likely to be because of changes in the market caused by the emergence of green innovations.

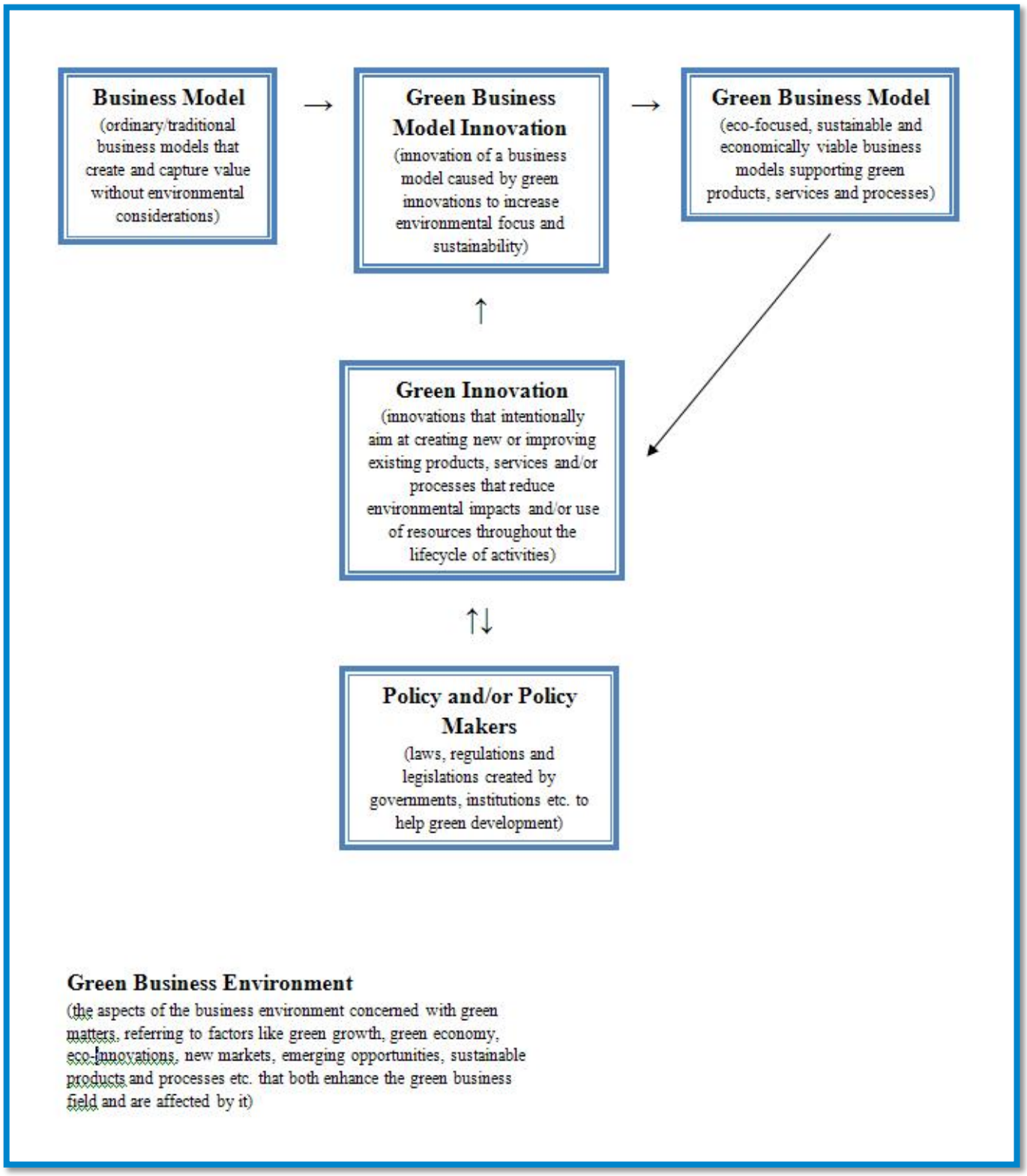

Figure 1: Figurative illustration of how BMs are transformed into GBMs and the role of policy and/or policy makers on the process.

Chapter 3: Methodology and Limitations

3.1 Chapter Objective

In this chapter, the rationale behind the research methods used throughout the process of gathering and analysing the data needed to answer the research question at hand will be presented. Furthermore, an overview of the limitations identified will be provided to address the credibility of the findings.

3.2 Research Strategy

With regard to the research strategy undertaken, a linear process of deduction, with elements of the inductive approach, is followed. A deductive approach refers to the creation of a research question or hypothesis on the basis of what is known about a particular domain, which then will be challenged empirically. Induction on the other hand, refers to the implications of research on the theory that led to the creation of a paper. This means that research findings challenge existing theory and lead to the creation of new outcomes. (Bryman & Bell, 2007)

In this thesis, though the most common form of deduction is to identify the theory first and then present a hypothesis or research question on the basis of this, the process was reversed. Instead, therefore, the Research Question (RQ) to be answered was presented as one of the first things in the thesis' introductory chapter, with the relevant theory surrounding the domain of focus following right after. The theoretical considerations made had to do with the concept of GBMs, as well as notions related to it (App., Fig. 8). The result was the formation of a model displaying the interrelations between the terms surrounding the notion of GBMs with regard to the focus of the RQ, while simultaneously acting as a potential answer to it.

Further, two case studies were chosen and interviews were conducted with members of their staff in order to gather data that would allow the author to scrutinize the aforementioned model/answer developed in the literature review. Though other methods of research were considered, the case study approach was chosen as it forms one of the most common forms of qualitative research, which was the preferred research design in this case (more on this in segments 3.4 and 3.5.1).

The outcome of the thesis (look at chapter 5) took a more inductive form, as the model was pitted up against the empirical data collected, in order to assert its applicability, transferability and eventual limitations based on the chosen social setting. The aim was to determine interpretivistically whether or not this model could be perceived as a potentially suitable answer to the RQ posed, as well as provide some suggestions concerning which other matters should be addressed with regard to the GBM field.

The research strategy can therefore be said to be based on a combination of the literature research conducted and the chosen form of research design. Both of these are presented next.

3.3 Literature Research

The data, articles, journals, conference papers, booklets etc. dealing with the terms surrounding the notion of GBMs, were collected through searches of EBSCOhost (through its main portal, as well as through the Business Source Complete and CBS E-journals Service), JSTOR, the OECD iLibrary, and Google Scholar. In these searches, key words were inserted into the various search engines (e.g. Business Model, Green Business Model etc.), and the highest ranked results that were widely cited and proved to be of actual relevance to the thesis were then selected for further reading.

Furthermore articles, journals, publications and books were recommended by various professors and colleagues, while others were already in the procession of the author from previous courses undertaken at the Copenhagen Business School and related studies conducted. Again, they were assessed for immediate relevance to the domain of focus and used if perceived relevant and trustworthy.

Once a sufficient amount of theoretical data and background information were collected for each concept and the focus field more generally, the literature review was created. It is important to note that not all studied material was used. Instead, the recognised works (authors, articles, publications, journal and books quoted and referred to the most) and the ones most relevant to the requirements of the RQ were chosen.

Though the process of research chosen allows one to investigate various terms and knowledge fields through a variety of databases and means of publication, it can also be quite overwhelming method. The end result is often a vast amount of literature at the hands of the author, forcing him to make choices as to what will be used and what will not. This could imply potential elements of subjectivity. Also, even though so many different sources of research where used for this process, there is always the chance of some relevant literature being overlooked, which can in result be said to limit the validity of the thesis.

3.4 Research Design

With regard to the research design, the author opted for a Case Study Design (CSD). The CSD refers to the detailed and intensive analysis of a single or multiple cases and is applicable for both deductive and inductive forms of research. It also forms, as previously stated, one of the more popular and well-known research design formats in business and management literature. (Bryman & Bell, 2007)

More than this, this approach was chosen as it offers a more in-depth and focused research area, with contemporary and up-to-date data (qualitative data). Though the thesis will not revolve around the case itself, it will allow for a direct comparison with the modular outcome of the literature review, and therewith hopefully add to the understanding of GBM development and the green business field more generally. The CSD has therefore been deemed as a useful means of analysis. (Bryman & Bell, 2007)

Furthermore, the use of a case study approach allows for an interpretivistic method of looking at the RQ, as it creates a more explanatory and inductive outcome. Interpretivism does not prove or disprove a hypothesis, but instead it attempts to explore and explain how all the factors comprising it are related and co-dependent within a social setting. In other words, it is more interpretive, rejecting a single version of the truth and allowing instead individuals or groups to construct their own version. It is often also a fitting approach with qualitative data collection methods, which will be discussed later. (Oates, 2006; Bryman & Bell, 2007)

The consequence of using this technique is that a single case (or two in this particular case) do often not allow for the findings to be generalised to a wider context, meaning external validity is

compromised (look at section 3.6). Though a matter often ignored by researchers with a qualitative background, as they are aware that a single case does not necessarily form a typical case, it becomes a significant limitation if theoretical generalizability was to be achieved on the basis of this thesis. (Bryman & Bell, 2007)

The two cases chosen to fulfil the requirements posed here are Semco Maritime A/S (as the primary case) and Prospect Law Ltd (as the secondary/supportive one). Semco Maritime A/S was chosen as they are a large organization operating partly within the renewable energy sector. More specifically they are involved in large projects regarding water solutions and wind farms for the emerging wind industry. On the basis of this, it was assumed that their operations within the green sector could be affected by and also result in green oriented innovations, which in turn could lead to structural (business model) changes. Further, the wind industry is one that is heavily dependent on and affected by government initiatives and policy.

On the other hand, Prospect Law Ltd, a legal disciplinary practise specializing in expertise concerning the energy and environmental sectors, was selected to provide additional insights to the matter of the role of policy within the green sector and the subsequent influence they may have on the transformation of GBMs. More details about both case studies are presented in chapter 4.

3.5 Data

Having presented the research strategy of the paper, next we must look at the data used to answer the RQ. Focus will be placed on the means of gathering the needed data, as well as how they were processed.

3.5.1 Form of Research

An initial step to take with regard to the data collection is to decide upon the form of research that is to be conducted, and subsequently the methods to be used. Generally, there are two common ways in which to perform research, namely quantitative and qualitative (Bryman & Bell, 2007).

Based on the research strategy and the requirements of the research question, the method of data collection used in the thesis has a qualitative outlook. The reason for this choice is that this form

of research opts for quality over quantity, allowing for the accumulation of rich data with depth. Furthermore, there is emphasis on both deductive, as well as inductive means, and often takes the form of face-to-face interviews, permitting the presentation of the point of view of the participants and therewith allowing for a better understanding of the world through their eyes. Finally, qualitative research embodies a view of social reality as continuously changing depending on the individual, allowing therewith for the creation of interpretivistic outcomes in contrast to the static image of social reality that quantitative research often provides. (Bryman & Bell, 2007; Oates, 2006)

3.5.2 Data Collection

The first data sets that were collected with regard to the thesis were the ones required to form the literature review and theoretical background of the RQ. This data, as explained in segment 3.3, was assembled through research in various online databases, as well as through examination of articles, books, journals, conference papers, booklets and other publications.

After creating a theoretical overview of the fields of GBMs and GBMI, and carefully studying the established RQ, a number of organizations involved in green business practises were contacted via phone or email to form the case subjects required by the CSD. Though a number of companies declared an initial interest in participating in the project, only the two organizations mentioned above came through; namely Semco Maritime A/S and Prospect Law Ltd. Most other firms referred to lack of time and resources as their reasons for not being able to contribute to the research.

Semco Maritime A/S

Semco Maritime A/S is a leading contracting and project-engineering company dedicated to providing the global energy and marine sector with onshore and offshore projects, solutions and manpower, and forms the primary case of the thesis.

Information on the company with regard to the creation of a case study was collected through online research and the acquisition of a number of internal company magazines, brochures, booklets and flyers (either found online or send by the company). Information from the subsequent interviews conducted with members of staff was also used.

With respect to the further collection of relevant data, a company visit to the headquarters in Esbjerg, Denmark, was coordinated with the firm. Members of staff provided a tour of the Semco Maritime A/S facilities at the Esbjerg harbour and provided the author with additional company material (power point presentations, magazines, booklets, reports etc.).

More than this, to gain further information on Semco Maritime A/S and attain some primary data, a number of open-ended interviews with three individual members of the organization, each occupying a different position, were arranged. Open-ended interviews refer to when the enquirer asks "*broad questions that do not necessarily require specific answers, but answers that may elaborate upon and lead to a dialogue... also known as qualitative interviews"* (Bødker et al., 2004, pp.228).

The reason for conducting unstructured interviews is because it is believed that qualitative data will be more useful and insightful with regard to the RQ. Out of the various advantages qualitative interviews have over quantitative approaches, one of the main ones considered is that there is a clear reconstruction of events (Bryman &Bell, 2007). This implies that events are reconstructed as questions are asked, due to the fact that interviewees will have to rethink about how a certain series of events unfolded with regard to a given situation. This will be beneficial for the thesis, as the focus will be on relating the responses received from the questions posed to the theories identified in the Literature Review chapter.

The motive behind interviewing employees with dissimilar positions, at different levels of the organization and with varying backgrounds, is to assure a broad range of answers and saturation of results. Therefore, questions were asked to the company's innovation manager and strategic planner of offshore wind power, an engineering manager, and the vice-president of wind, oil & gas. All three arranged interviews took place in Esbjerg, Denmark, at the Semco Maritime A/S Headquarters.

Prior to the interviews and with the aim to gain insights to the themes of GBMs, GBMI, and green business more generally from the interviewees, it was deemed important to make it clear to them that they would have as much freedom as possible during the questioning process. This

decision was taken on the assumption and belief that this approach would provide the most honest and useful answers, while creating a relaxed and open atmosphere. (Bryman & Bell, 2007; Bødker et al., 2004)

Emphasis was also placed on the fact that open-ended interviews implied that both parties would be free to question one another if any misunderstandings or misconceptions occurred. Such assurance was given, as it was the concern of some interviewees that they would not be familiar with certain notions or themes of focus. This consideration, together with the establishment of which topics will be discussed and how the interviews will be organized and subsequently conducted are thought to lead to the creation of an environment that is better suited for knowledge sharing, while providing a wider assortment of answers (Bødker et al., 2004).

However, though on an open basis and with two-way communication to avoid misconceptions, the interviews were still loosely structured around some general question/themes to assure the compilation of relevant information with regard to the area of focus. These general questions (though subject to change and not necessarily brought up by the interviewer during the interviewing process) can be seen in the Appendix, Fig. 9.

Finally, the interviews with the Semco Maritime A/S employees were recorded using an iPhone 4G, as that was the only recording device possessed by the author. The recordings were transcribed at a later point and can be seen in Appendix B.

Prospect Law Ltd

Prospect Law, a legal disciplinary practice combining the legal expertise of both solicitors and barristers under one roof, with specialist expertise in the energy and environmental sectors, forms the papers secondary case.

Information on the company with regard to the creation of a case study was collected through online research and information provided by the firm itself. Information from the single interview conducted with a Prospect Law employee was also used to provide additional inputs to the case study.

In contrast to the Semco Maritime A/S case, open-ended face-to-face interviews, though requested, were not an option with this firm. The reason for this had to do with company time, distance and resource constraints. Instead, emails were exchanged between the interviewer and the interviewee Prospect Law provided (a paralegal and renewable energy project manager), with a number of questions to be answered being presented each time. All the questions and the answers provided can also be seen in Appendix B.

The limitations attached to this form of interviewing (e.g. time for interviewee to prepare his/her answers, inability to address miscommunications or misunderstandings, inability to observe body language etc.), as well as the limited number of interviews conducted (received only one response) make this data set of a secondary nature with regard to assessing the model developed and answering the RQ.

3.5.3 Data Processing

The first step to processing the data gathered from the interviews conducted with Semco Maritime A/S was to transcribe the interviews. Though a rather tedious and time consuming process, it is also rewarding, as it tends to bring the interviews back to life, while allowing the researcher to make a first assessment as to how the data will be used to analyse and discuss the RQ (Oates, 2006). The transcriptions were then sent back to the interviewees to confirm that their statements were correct and that they could stand behind what was stated.

In the case of Prospect Law, the question and answers from the various email exchanges were all gathered together into one document. This allowed for the creation of an overview of the information gained from the interview, as well as a valuation of how the data would be used in the further sections of the paper. Once more, the final document containing all questions and answers was sent back to the interviewee to confirm that these were indeed his/her words and statements.

All secondary data gathered for the creation of the Literature Review and the Case Studies (e.g. from articles, journals, books, booklets, magazines, brochures, publications etc.) were assessed for their relevance and credibility, assuring they originated from prominent academic scholars and industry leaders.

3.6 Trustworthiness of Data

Trustworthiness of data, as described by Bryman & Bell (2007) is "*a criterion of how good a qualitative study is*" (pp. 43), It contains four main aspects; namely credibility (the plausibility of the findings), transferability (the applicability of the findings to other contexts), dependability (the applicability of findings at other times), and confirmability (the intrusion of the researchers values to a high degree).

With regard to the aspect of credibility, it is safe to assume that the data collected for the purposes of this paper are highly established. The reason for this is that the research has been carried out according to good practice, the methods used have been thoroughly described and justified, respondent validation has been undertaken to assure confirmation of the correct understanding of the social world by the researcher, and the secondary data gathered is devised from recognized sources. (Bryman & Bell, 2007)

Transferability instead can be assumed to be somewhat limited. This is typical of qualitative research, as it focuses on depth rather than breadth - this thesis being no different. The result of this is findings that are "*oriented to the contextual uniqueness and significance of the aspect of the social word being studied*" (Bryman & Bell, 2007, pp. 413). In this case the transformation of BMs into GBMs and the role policies and/or policy makers have on the process are emphasized based on only two cases. The data, and the eventual findings, can therefore be difficult to generalize or modify to fit other business contexts.

On the other hand, dependability of the gathered data can be perceived as satisfactory. As mentioned previously, thorough research was conducted on the theories and frameworks presented, while appropriate methods were used to gather all the data and information needed, whilst carefully explaining the process of doing so. It is therefore believed that the same data can be replicated at an acceptable level at another time, if the methodology and research methods applied in this thesis are imitated. (Bryman & Bell, 2007)

Finally, there is the aspect of confirmability. Though complete objectivity from the researcher is impossible (Bryman & Bell, 2007), it is thought that the author attempted to act in good faith by trying to minimize the effect of personal values and also avoid inclinations to influence the findings of the research. Subjectivity however remains a factor.

3.7 Limitations

As with many reports, publications, articles etc., regardless of how trustworthy they may be considered, limitations are often identified. Thus, as this thesis is no exception, the most acknowledged limitations will be presented, providing insights as to what might have been done differently in retrospect in order to increase objectivity and trustworthiness of the outcomes.

From the point of view of the empirical data gathered, it becomes obvious that a larger number of Semco Maritime A/S employees could have been interviewed, while a second round of interviews could also have proved useful in order to increase the validity of the data collected. This would have provided the option to ask eventual questions that might have emerged after the initial interviews had been conducted or questions that simply had been overlooked, while also potentially contributing to an increase in the variety of received answers. However, resources and time restrictions from both parties (the researcher and the organization) did not allow for such proceedings.

Also, the fact that the interviewees from Semco Maritime were all Danish, making English their second or even third language, might have resulted in some variations regarding the definitions and the understanding of some terms and notions used during the interview process. Perhaps, if a language barrier of this kind was not present, the answers received might have been different.

Remaining on the limitations of the empirical data collected, the answers received from the Prospect Law Ltd employee would have been considered more trustworthy if they had been produced by face-to-face interviews (Bryman & Bell, 2007). Also, interviews with a larger number of employees would again have enhanced the relevance of the data collected. However, time restrictions from the company's side did, once more, not allow for such undertakings.

With regard to the literature review now, one can address the selection and use of the literature chosen as a potential limitation. The argument here is that some of the frameworks and notions chosen were not developed to be used nor be analysed and discussed in the context of GBMs and GBMI. An example of this could be the segment describing the term Business Model, which is comprised of literature largely developed independently of the frameworks of GBM, GBMI and the notion of green business. Therefore, though all books, articles, journals etc. used were chosen and applied carefully on the basis of some predetermined criteria (look at segment 3.3), one

might still question the complete, pure and concrete validity of parts of the literary research for the subject matter. (Bryman & Bell, 2007)

Furthermore, more articles, journal, publications, books, presentations, magazines etc. could have been studied and subsequently included. Though a much larger number of readings were conducted compared to what the References in chapter 7 indicate, some works were just deemed surplus to requirements or simply irrelevant. Other works might simply have gone unnoticed during the literature searches made, as not all databases or search engines were fully covered.

Moving to the form of research method followed now, and more specifically the trustworthiness of the data collected, it is important to note that qualitative research does have some critiques and limitations. In relation to the issue of the researchers values mentioned in section 3.6 (confirmability of data), qualitative research is often considered to be too impressionistic and subjective. What is implied here is that qualitative research often begins in a general and open-ended way before it is gradually narrowed down into the problem formulation or hypothesis the researcher finds important and/or interesting. In contrast to quantitative research, which is more explicit, qualitative research often leaves the reader with few clues as to why the given topic was chosen instead of another. Though attempts were made by the author to minimize such implications, subjectivity cannot be fully eliminated. (Bryman & Bell, 2007)

More than this, qualitative research is also often very difficult to fully replicate (Bryman & Bell, 2007). Even with the appropriate guidelines in place, the lack of structure of the qualitative process will always require the researcher's ingenuity to some point. Though it is not considered the case here, as a methodical outline of the steps taken was made, one cannot be fully certain that another individual could duplicate the results achieved.

A final limitation with regard to the research method chosen and the results of the thesis is that there is limited validity, as qualitative research often lacks transferability. This means that the findings made can be difficult to generalize and transfer beyond the context of the research. This is because, what might apply for the transformation of a BM to a GBM as well as the impact policy has on this process might vary from business to business, region to region, and nation to nation. Only more extended research, which is beyond the resources and scope of this project, can provide a conclusive answer to such implications. (Bryman & Bell, 2007)

Chapter 4: Case Studies

4.1 Chapter Objective

The objective of this chapter is to provide a descriptive overview of the organizations that will be used in this thesis to analyze and discuss the GBM transformation framework developed in chapter 2. As already stated, the companies in focus are Semco Maritime A/S, which will form the primary case study, and Prospect Law Ltd, which will be used in a supplementary manner.

4.2 Semco Maritime A/S

Semco Maritime A/S is a leading contracting and project-engineering company dedicated to providing the global energy and marine sector with onshore and offshore projects, solutions and manpower. The company works with manufacturers, operators, contractors and end users in order to facilitate the design, fabrication, service and maintenance of their customers' assets. In other words, Semco Maritime provides comprehensive project management across all phases of energy and marine projects to assure that customers and partners experience safe and cost-efficient operations. (www.semcomaritime.com)

The company has highly specialized knowledge of integrating equipment and process, as well as unique skills for understanding and identifying the needs of customers and partners. A full list of the services and solutions provided by the organization can be seen below (Table 2). (www.semcomaritime.com; Semco Maritime Company Booklet, 2012)

Semco Maritime A/S Services and Solutions	
Project Management	Yard and Workshop Facilities
Engineering and Design	Upgrades and Refurbishments
Procurement	Maintenance, Modification and Servicing
Construction and Fabrication	Products, Components and Technology
Instillation and Commissioning	Operation Support

Table 2: Overview of the services and solutions offered by Semco Maritime to its customers and partners (Source: Semco Maritime Company Booklet, 2012).

4.1.1 The Story – Small Beginnings, Great Future

It all began in 1888, when Semler & Mathiassen, a castings and stove manufacturer opened for business. The company found some initial success and expanded rapidly, venturing into new areas. Only in 1945 however, did the company begin to produce high quality technical instillations for the marine and shipbuilding industry.

The first offshore business unit was established in 1980 in Esbjerg, Denmark, to provide project engineering, maintenance and manpower services for the offshore oil and gas operations in the North Sea. As the company evolved, so did the structure and in 1998, Semco Maritime was born.

Semco Maritime A/S has since grown from a small company providing straightforward technical instillations into a high-tech, international organization covering all disciplines within engineering and construction for the energy sector. The yearly revenues from 2007 to 2012 are presented below, in Table 3. Today the company employs over 1,900 people and through numerous acquisitions in Denmark, Norway and the United Kingdom (UK) they handle even the largest upgrade projects.

Year	2007	2008	2009	2010	2011	2012
Revenue (in million DDK)	1.281,6	1.569,0	1.331,8	1.265,2	1.764,5	2.400,0

Table 3: Semco Maritime A/S revenues per year (Source: www.semcomaritime.com)

The headquarters remain in Esbjerg, however sales and marketing offices can now also be found in Dubai, Singapore, Vietnam, The United States of America and Central America, as well as advanced fabrication facilities in Denmark and Vietnam. Semco Maritime is fully owned by C.W. Obel A/S, a Danish investment fund. (www.semcomaritime.com; www.cwovel.dk)

4.1.2 Market Sectors

Semco Maritime participates as a contractor or subcontractor in five main market sectors, namely Oil & Gas, Rig Projects, Wind Power, Power Projects, and Products and Technology. Each one of these market sectors will be briefly presented next. A figurative overview of them can be found in the Appendix, Fig. 10. (www.semcomaritime.com; Semco Maritime Company Booklet, 2012)

Oil & Gas

In the Oil and Gas sector, the company has over 30 years of experience, supplying a full range of engineering and project management solutions. They provide everything from design (e.g. consultation, feasibility studies, front-end engineering and design etc.) and procurement to construction, fabrication (e.g. modules, skids, steel structures etc.), as well as instillation and maintenance services for offshore operations. Electrical and instrumentation systems, telecommunication systems, accommodation modules, fire and gas detection systems and technology solutions (hydraulic systems, fluid systems, chemical injection systems, hydraulic power units and triplex pump units) are also developed for their customers in this industry. Finally, the company offers operation manpower services with engineers, technicians and operatives. Semco Maritime has approximately 700 employees working with offshore instillations in the Norwegian and Danish oil and gas sector. (www.semcomaritime.com; Semco Maritime Company Booklet, 2012; Semco Maritime Brochures, 2008:B, C, D, E; 2009:A, B)

Rig Projects

Exposed to corrosive saltwater, high winds and extreme shifts in temperature, rigs are often in need of servicing every five years. From the piping systems to the accommodation blocks, everything requires inspecting, refurbishing or upgrading to keep the rig operational and safe.

Semco Maritime A/S undertakes a significant amount of such projects concerning rig upgrades, servicing and refurbishments offshore, on their own yard facilities in Esbjerg, as well as in other ports around the North Sea area. They also provide upgrades and new technological instillations to the rigs, such as telecommunications systems, fire fighting systems, and fire and gas systems. Operational manpower support for such undertakings is again on offer. (www.semcomaritime.com; Semco Maritime Company Booklet, 2012; Semco Maritime Brochures, 2008:A, D, E)

Evolution of Oil and Gas to Renewables (Wind and Power Projects)

Over the last twenty years, Semco Maritime A/S has built a solid reputation in the offshore and onshore energy markets and has progressively moved into the market for new and renewable energy solutions. This is viewed as a natural transition, since traditional and alternative solution requirements are similar, with the later forming a highly innovative and rapidly growing business

area, if the appropriate know-how and expertise are in place. (www.semcomaritme.com; Semco Maritime Company Booklet, 2012)

Wind power forms one of the most accessible sources of non-fossil energy, while remaining an industry with high levels of innovation and fast development. Figures 11, 12 & 13 in the Appendix (A), show offshore wind developments and milestones in the EU, as well as the European and global outlook of offshore wind energy. Semco Maritime offers engineering and design solutions for the wind sector, consultancy and project management, as well as maintenance, modification and operational manpower services. Amongst other accomplishments, they have laid cables on major offshore wind farm projects in the UK, including Burbo Banks, Walney I & II and Gunfleet Sands, and have provided the world's first offshore accommodation module for the Horns Rev II project in the North Sea. They are also market leaders in production of offshore substations for wind parks. (www.semcomaritime.com; Semco Maritime Company Booklet; E-On, 2012; Semco Maritime Brochure, 2010)

The company is also involved in various power projects around the globe. They run projects for the safe generation and transmission of energy by providing their partners with turnkey contracting (meaning ready to use infrastructures and solutions) to diesel, hydro, wind, solar and electrical power; transmission lines and systems; turbine and reciprocating engines; communication equipment; and operation and maintenance services. They have recently completed projects in Central America, India, the Philippines, China, Egypt, Vietnam, Greenland, Africa, and the Maldives. (www.semcomaritime.com; Semco Maritime Company Booklet; Semco Maritime Brochure, 2008:E, 2009:B, 2010)

The move towards such sustainable energy solutions (wind, hydro, solar etc.) as the ones described above, and the increased focus on new projects in these areas, suggests the development of a greener mind-set within Semco Maritime. The involvement in the green field has lead to a focus on green innovation, environmentally sound project panning, green oriented customers, and the creation of a Renewables Department within the firm, subsequently promoting the move towards the implementation of a greener BM. (www.semcomaritime.com; Semco Maritime Company Booklet; Interviews)

Products and Technology

Finally, there is the sector of products and technology, which delivers custom solutions based on the requirements of the other sectors. Semco Maritime A/S designs and develops a wide range of in-house concepts and products for automation, communication, control, electrical, hydraulic, fire and gas, and instrumentation systems to benefit their customers. They also supply various components to clients, and even competitors, while combining personal service to minimize downtime. (www.semcomaritime.com; Semco Company Booklet; Semco Maritime Brochures, 2008:A, B, C, D, E; 2009:A, B)

4.1.3 Strategy, Values and Vision

As any multinational organization, Semco Maritime A/S has an established strategy, as well as a clear vision and values. These organizational matters will be briefly presented here. (www.semcomaritime.com; Semco Maritime Company Booklet)

From a strategy perspective, the organization has made it clear that they wish to be their customers' first choice within the energy sector, the first choice as a workplace for employees, and the first choice as a benchmark baseline on execution. In other words they wish to expand and achieve significant market share within their industry while maintaining a high standard across their operations and for all stakeholders involved. (www.semcomaritime.com)

In order to successfully reach the above strategic goals, a set of values must be implemented throughout the organization, acting as the foundation for the strategy. The values highlighted are commitment, responsiveness, reliability and inspiration. Based on these values and the company strategy, the vision becomes "*to be the energy sector's first choice for safe solutions that consistently exceed expectations*" (www.semcomaritime.com).

Semco Maritime A/S focuses on three main pillars within their strategy and that is market, execution and workplace. Establishing leading positions in selected niches through strong customer relations, maintaining strong performances by continuously improving, implementing a lean and cost-efficient operation and by setting new standards, while focusing on developing a safe and highly attractive working environment, all lead to the formation of the company motto of "*dedicated people, exceeding expectations with projects, solutions and competencies for the energy sector*" (www.semcomaritime.com).

4.1.4 Organizational Structure

As previously mentioned, the company headquarters are located in Esbjerg, Denmark, with sales and marketing offices also found in Dubai, Singapore, Vietnam, the USA and Central America, as well as advanced fabrication facilities in Denmark and Vietnam. They employ well over 1900 people and seek a flat and flexible organizational structure, in order to be able to meet the emerging challenges of the worldwide energy sector.

A chart of the company's operational organization as presented on their website, with some input from a chart given to the researcher by the company, can be seen below in Figure 2.

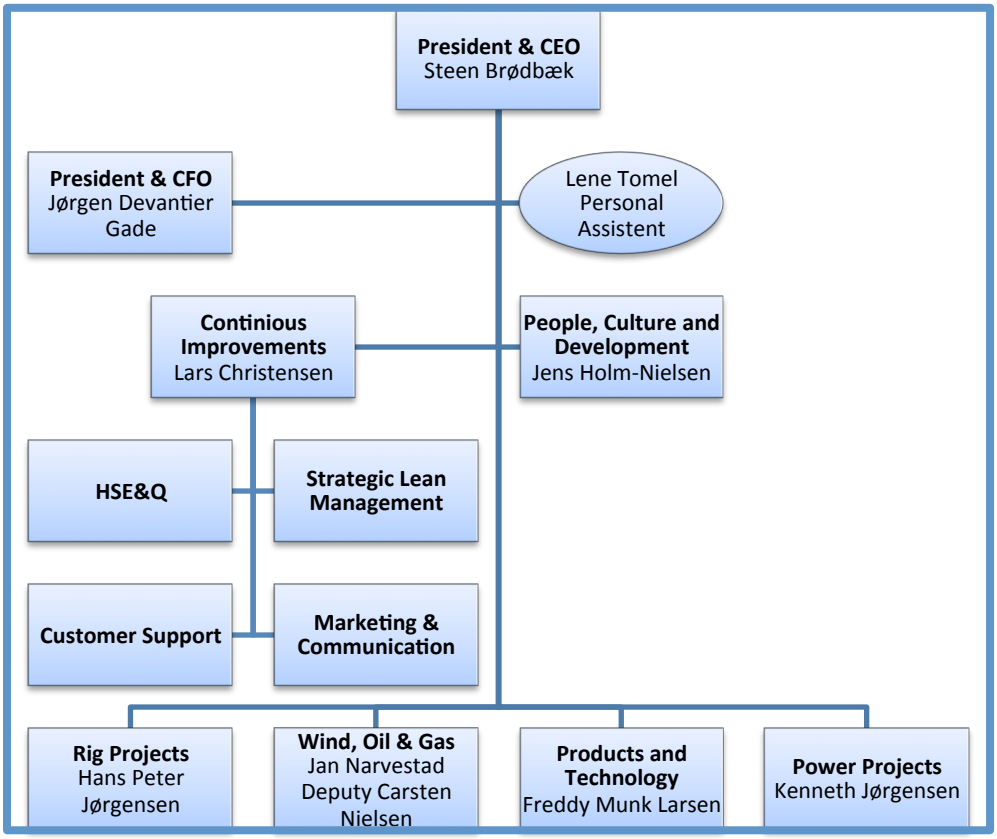

Figure 2: Organizational chart of Semco Maritime as of January 2013 (Source: www.semcomaritime.com)

4.1.5 Environment and Corporate Responsibility

A big part of the company culture at Semco Maritime A/S seems to be their Corporate Responsibility (CR) strategy, affecting the day-to-day operations and addressing sustainability, community, the environment and the people involved. (www.semcomaritime.com; Semco Maritime Company Booklet, 2012; Semco Maritime Brochure, 2012)

In order for Semco Maritime to be their customers' first choice within the energy sector, the first choice as a workplace for employees, and the first choice as a benchmark baseline on execution, CR practises have been formalized into the company strategy in order to safeguard the communities they work in. Customers, suppliers, and stakeholders are also encouraged to do the same.

Further, the company is committed to continuously improving their environmental impact (use less energy, resources, decrease waste etc.). In this regard, Semco Maritime A/S is third party certified according to ISO 9001 and ISO 14001 standards. They are also a member of the United Nations Global Compact, which consists of ten principles in the areas of human rights, labor, the environment and anti-corruption. More than this, the company educates its employees on green matters. (www.semcomaritime.com; www.unglobalcompact.org)

4.3 Prospect Law

Prospect Law is the first legal disciplinary practise to combine legal expertise of both solicitors and barristers (attorneys who have the exclusive right of argument in all the superior courts in the UK) under the same roof. Though a rather young company, it is closely engaged with some of the most topical areas of commercial development activity in the UK and abroad. (www.prospectlaw.co.uk)

In addition the firm specializes in expertise concerning the energy and environmental sectors. More specifically, Prospect Law has "*particular experience in both the fast growing renewable energy sector and the nuclear industry*" (www.prospectlaw.co.uk). The National Westminster Bank and The Royal Bank of Scotland are two of the firms' most valuable clients, having appointed them to both their legal and technical review panels for renewable energy projects. Prospect Law provides legal advice and advocacy in various business areas, including planning and environmental, public, commercial and property law, as well as dispute resolution and regulatory compliance and defence.

With explicit regard to the energy and renewable sector, they work closely with their sister company, which is called Prospect Energy Ltd. This sister company provides complimentary "*technical consultancy services and direct project assistance for both traditional and renewable*

energy technologies including onshore wind, biomass, energy from waste and micro hydro systems, to companies and landowners across the UK" (www.prospectlaw.co.uk/prospect-energy). Prospect Energy Ltd also covers feasibility studies, planning consultancy, investor due diligence, project finance, project management, and energy audits for energy projects. (www.prospectlaw.co.uk; www.prospectenergy.co.uk)

Between them, Prospect Law and Prospect Energy Ltd offer a complete, single point of reference for environmental and energy development projects. Their clients spread over various sectors, including local authorities and London based asset management firms, as well as private companies, agricultural estates, quarries and private households. They operate primarily around the UK by advising and supporting UK firms wanting to sell products, create production facilities in or attract investment from Asia and the Middle East. They also help clients from China and the Middle East that are looking into business investment opportunities in the UK and/or continental Europe. (www.prospectlaw.co.uk; www.prospectenergy.co.uk)

Chapter 5: Analysis and Discussion

5.1 Chapter Objective

In this chapter, elements from both the literature review and the case studies identified will be used to provide an interpretivistic analysis and discussion of the problem field within a given social setting. More specifically, the main results from the interviews conducted with members of the organizations that formed the two case studies presented above, namely Semco Maritime A/S and Prospect Law Ltd, will be pitted up against the model developed at the end of chapter 2 (Fig. 1), which depicts a literary view of a Business Models' transformation course to become a Green Business Model, and the role of Policy in this process (therewith suggesting an answer to the RQ). The objective will be to identify in which areas theory and practice are in agreement and in which they oppose or offer no insights in connection to the scope of the thesis.

The eventual findings will then be highlighted, together with some identified limitations and applications of the model developed. A conclusive overview and answer of the RQ will be given in the next chapter, together with some emerging questions and reflections, and suggestions for further research.

5.2 GBM Transformation Model vs. Outcomes from Interviews

The model depicting the process of Green Business Model transformation developed in the conclusive parts of chapter 2 (pp. 41) can be said to provide a summary of the main findings of the literature review developed. It also suggests an answer with regard to the RQ at hand, namely **"***How are Business Models transformed into Green Business Models? How do Policies and/or Policy Makers influence this process?*".

Looking at the proposed framework, the box titled Green Business Model Innovation seems to take centre stage. As stated in the introductory parts of the thesis, this notion has become an emerging concept in the business world attempting to help firms successfully correspond to developing trends, changes, opportunities, and challenges posed by the emerging field of green business. It therefore appears to be an immediate answer as to how ordinary BMs are indeed transformed into greener ones.

However, the idea of GBMI does not provide all the information needed to understand how a green focused business model comes about, as it does not specify which factors cause the actual change. In other words, it only indicates the process of the transformation itself. Instead one must look at the steps that lead up to the very process of GBMI; namely the surfacing of green innovation and the impact of policy and policy makers.

5.2.1 The Significance of Green Innovation in the Transformation Process

More precisely, the realization of the need for organizations to increase their environmental consciousness in the last few decades can be said to have spurred changes in the general business market, by placing a new focus on sustainability and creating therewith business opportunities in existing and emerging sectors through innovation of products, materials, services and processes. The empirical data seem to support this notion, as can be seen from the words of Semco Maritime's innovation manager:

"*If you look back 10 years ago, the market didn't look as it was going to be very big… It was like a philanthropically, experimental thing and not big business. Today…it evolved to be something very big and that's why for us it starts to become extremely interesting for us. For us it was not like, it was not in our strategic planning, but it became a point after a while because the business is now going to be very very big…Today, we have a strategic business plan that in 2015 we should turnover more than 500 million DKK in a year within this area. So, the expansion of this is enormous and the potential in the market is enormous.*".

The changes brought about in the business sector by the idea of environmental consciousness, and the evolving opportunities that follow the emergence of the green business environment, can be said to lead to the development of innovations (e.g. products, process, service etc.). At the same time though, to achieve a shift in focus towards a greener economy, green growth and greener developments, innovative solutions must also already exist to initiate and support the movement. Hence, it becomes clear that innovation can be seen as both a force of green development and the result of it, making it an essential notion for the green business field and consequently GBM development.

More specifically, it can be assumed that without the idea of innovation, organizational BMs would not have to undergo any major alterations to match the market, the customers and

processes (Teece, 2010; Baden-Fuller & Morgan, 2010). The result of this would therewith be a lack of BMI and with that no GBM advancement, as green innovation is believed to be a leading factor resulting in the need for green focused business model implementation. Several interviewees indicate the importance of innovation with regard to their business and the green sector all together:

"*Its engraved in the company, it's engraved in our business model and in our strategy. If you do not have an innovative company you will stand still in your development and in these days, in this market that we are in today if you stand still it is the same as going backwards. So, other companies who are smarter and more innovative will overtake you within very short time... So we need to innovate all the time, constantly, otherwise you'll be left behind*" (Innovation manager, Semco Maritime)

"*So, innovation is, I think is very important also for develop new methods and taking in some new products and materials and so on, to make the work easier, to make the project more cheap and that way…. I think that we have to be at the beat, in front, because otherwise you will be a grey, conservative, not-excited company*" (Engineering manager, Semco Maritime)

"*Innovation is, in my view, the biggest reason that new businesses successfully enter the market… It is hard to say exactly how big a role innovation plays as it can be from very little to very large*" (Renewable energy project manager, Prospect Law)

Thus, it can be said that though GBMI can appear to be the central figure in the established GBM transformation model, green innovation is the cause of the need for BMI in the green business field in the first place, resulting in changes to existing markets, standards, and processes. It can therefore be argued that ordinary BMs are transformed into greener ones due to the existence and emergence of green innovation, which alters the way in which value is created for the customers and how it is captured by the organization and its stakeholders. As the innovation manager of Semco Maritime mentioned:

"*So they are different issues that we need to learn in our company when you work in the green market or with the green customers...when we do green projects… we need to look at the market in a different way than when we only did oil and gas instillations. Now new players, new customers has been presented to us… Of course there is an overlap, but there is also a new part*

of the strategic plan and… different rules and regulations… they are different issues that we need to learn in our company when you work in the green market or with the green customers"

Finally, according to the model developed in the literature review, the resulting GBMs from the arising green innovations, once integrated by organizations, are assumed to lead to an additional increase in focus around green growth and the field of green business. The outcome of this could be the development of more green oriented innovations (as indicated by the arrow between the two boxes). This in turn could potentially lead to further changes in the green business environment and once again require firms to undergo BMI to stay ahead of the curve, resulting in an endless circular process. Policy and policy makers would also be affected by such undertakings (more on this in the next segment). Unfortunately the interviews conducted did not provide any evidence to support this link, limiting therewith its validity.

5.2.2 The Role of Policy and Policy Makers

Though innovation - whether as a force or an outcome – can be said to be the most pivotal factor causing the emergence of GBMs, it is also itself dependent upon the support of policy and policy makers in order to set the right framework conditions and allow for business development. This is so, as stated in the literature review, because the establishment of predictable and stable policy signals, regulations and legislations are thought to enhance green innovation, without which green transformation would be very difficult and costly (OECD, 2009; 2011:B, Henriksen et al., 2012:B). Furthermore, such actions improve the chances for green growth, which in turn leads to the support and development of a green economy, both of which are essential elements to the establishment of green business and successively the need for GBMI. The result of this can therefore be said to be that policy and policy makers already play a large role, and will possibly continue to do so in the future, when it comes to the enhancement and success of green innovation. It is therefore safe to assume that they have a significant effect on the process of GBM transformation.

The above assessment regarding the role of policy and policy makers and the influence they have on green innovation is also identified in the GBM transformation model developed. Further, it is a statement that is also supported by the interviewees in this thesis. Some relevant quotes extracted from the transcriptions are provided below.

"*if the government do nothing and the television and the internet is not hyping the green thing we would go around in smog and dirt I think, yeah."* (Engineering manager, Semco Maritime)

"*Very big role* [policy makers play]*...one of the most important issues is the political… there is no doubt that within renewable energy the political issue is very very important and the politicians, they can kill the market within very short time or they can have the market explode within very short time...everybody they are very green, but when it comes down to the money and having the wind turbine in their back yard, then it is suddenly a different issue. So, when you look at this from a political point of view, of course there will be huge discussion on how do you get the funds and where do you get the money from*" (Innovation manager, Semco Maritime)

"*Almost certainly – and I dare say that is their aim* [to affect the way green firms do their business]. *There are UK systems such as the Climate Change Levy in which companies are taxed for energy usage – leading to greener practices and greater efficiency, European initiative such as WEEE regulations 2006... there are also businesses that are set up in order to service markets created by government policies/regulations... If the playing field is level this allows firms to make the choice to act in a sustainable manner without losing out, whereas if they are able to utilise Government policy to gain competitive advantage this will drive forward such behaviour and establish it as the norm*" (Renewable energy project manager, Prospect Law)

"*they are enablers because they are supporting the law and putting pressure into the industry, pressure onto the power plants and these things, so. If it's just been normal business there wouldn't have been any offshore wind parks*" (Vice-president of wind oil & gas, Semco Maritime)

Besides the above citations, a number of the interviewees also provided policy recommendations for the future (e.g. further support of innovation, research, education, infrastructure etc.), suggesting that governmental support will continue to play a significant role going forward as well. More than this, these proposals seem to be along the same lines as the ones put forward by academics and the relevant business literature (App., Fig. 7).

However, it is also important to mention here that emerging green innovations are assumed to have an equal reverse effect on existing and/or future policies and policy makers too. That is to say policy may affect green innovation, but green innovation also affects policy. Such an

implication further establishes the centrality of the notion of green innovation. The argument here is that new developments (innovations) and market changes within the green field will presumably result in the need for adjustments of existing policies, as standards and requirements change, or the creation of new ones to provide adequate support to up-and-coming concepts. Without relevant and updated policies, green innovation may not achieve its full potential.

Though very little evidence was identified in the interviews conducted to support this argument, Semco Maritime's innovation manager did hint at it when talking about the need for an improved infrastructure between countries as more wind parks are developed. More precisely he stated:

"*it's not only building the wind park, it's also having an infrastructure to actually be able to handle the energy that comes from the wind park to go into the grid system. Building grid highways between the countries so that you can share the energy, when you have too much energy in Denmark when the wind is blowing very much you can maybe send the energy to Germany... Today when you have too much energy from the wind parks... we turn down the wind power and we still continue using the coal... But that's actually because of the infrastructure... And that's very much a new political issue*" (Innovation manager, Semco Maritime)

From this, one could say that the description of the need for increased and smarter infrastructure between countries due to green developments as a *new* political issue could imply that as green innovations are implemented (or emerge), new policies, standards, and developments will indeed need to be established or adjusted in order to increase their future relevance and impact. Again though, it must be stated that this forms a very loose connection to the previous argument.

In sum, it can be said that policy and/or policy makers can play an active role in enhancing the process of GBMI as they add to the establishment of the green business environment, and therewith can lead to, enable and be affected by green innovation – a key source of GBMI. The discussed interrelation between the notions of policy and innovation is exhibited in the model of the GBM transformation process through the use of two-directional arrows connecting the frameworks of Green Innovation and Policy and Policy Makers (look at pp. 41).

5.3 Findings

The results of the above analytical discussion lead to the general suggestion that the outcomes of the interviews appear to be in an agreement with, and therefore in support of, the model developed on the basis of the literature review. Based on this, one could therefore assume that it can act as a valid – though not conclusive - response to the Research Question at hand.

With this in mind, it has been suggested that traditional BMs are transformed into GBMs through a process of GBMI, caused by the emergence of Green Innovation. More explicitly, the materialization of the Green Business Environment is believed to result in the creation of new market opportunities, which in turn require new innovations with a green focus in order to be fully utilized. Development of such Green Innovations is further said to require BMs with a greener outlook, known as GBMs, resulting in GBMI, placing Green Innovation at the centre of the GBM transformation process.

Furthermore, the outcomes of the interviews seem to agree with the modular suggestion that Policy and/or Policy Makers also play a significant role in the transformation process of traditional BMs into GBMs. This is achieved by having an impact on, while at other times also being impacted by, Green Innovations and market changes.

On the other hand, some shortcomings between the interviews and the literature were also identified. The most obvious one refers to the suggestion by the model in Figure 1 (pp.41) that the establishment of a GBM in an organization would eventually lead to the creation of more Green Innovations, which in turn could lead to additional changes in the Green Business Environment and once again require the firm to undertake BMI actions to stay competitive. However, no such reference to back up the argument was made by any of the interviewees, which can be said to limit the framework somewhat.

5.3.1 Limitations of the Findings and Model

On the subject of limitations, it is important to state that though insightful, the findings from the analysis and discussion are also to be considered imperfect in some aspects. The most notable limitations (some of which have also been mentioned previously in relation to other contexts) will be revealed next.

Perhaps the most significant one of them all has to do with the nature of the research design chosen for the thesis, namely the Case Study Design, and the qualitative form of research conducted. The reason for this is that any results achieved through these means can be hard to generalize to a wider context, as they may lack universal validity and transferability (Bryman & Bell, 2007). This is because it is assumed that the case studies chosen might not always form a typical case, compromising therewith the legitimacy of the model in other contexts (e.g. if the model is used in relation to another firm or business sector, the outcome and its level of relevance may vary or be inconsistent with the findings of this thesis).

Additionally, the model can be considered somewhat deficient, as not all suggested connections between the acknowledged notions were empirically supported (e.g. the idea that GBM development leads to an increase in green innovation). Furthermore, it can be said to be rather abstract, as it ignores a number of important barriers and elements regarding the indicated process. One such example is the implication of costs related to GBMI. Often, the implementation of a GBM will require large investments, where the payback time is long and where ambiguity surrounds the savings and additional value created (Bisgaard et al., 2012). This could in result affect the willingness of a firm to undergo such a process, disturbing the development and future implementation of GBMs.

Finally, the model assumes that a sustainable society (one that is concerned with matters such as green economy, green growth, green innovation, appropriate policies etc.) is already in place when undertaking Green Innovations and implementing a GBM. Therefore some key factors and drivers (e.g. market conditions, knowledge and human resources, intellectual property rights etc.) and potential forms of resistance (from customers, employees, value chain members, policy makers etc.) are ignored. This can lead to the presumption that just because a firm develops green oriented innovations, has the finances to undergo a green business model innovation and sees an opportunity, does not mean that the environment in which it operates will allow it to reach the desired success levels.

For all these reasons, it is safe to say that though the empirical data agree in many aspects with the connections suggested by the developed transformation model, the outcomes are bounded to a very specific social setting and cannot be generalized without addressing the existing

limitations first. This naturally restricts the applicability of the framework, providing therewith inconclusive answers to the RQ and emphasizing the need for more research on the subject.

5.3.2 Implications of the Findings in Practise and in Theory

Irrespective of the identified limitations and assumptions of the GBM transformation model and the findings of the thesis, the framework can still be said to have some practical and theoretical relevance. Both types of implications are briefly considered.

From a practical point of view the model may still offer insights to managers concerned with strategy, innovation, organizational aspects etc. in the green industry about some of the factors and pre-requisites that must be addressed and which play an important role when it comes to GBMI and GBM establishment. Further, the restrictions of the current model insinuate that an improved and more complete version of the green transformation process could be created, which would consider all the existing limitations. This would also encourage the idea of more research in the green business sector more generally, which would in turn enhance its development, maturity and eventual success, as it remains an upcoming (Appendix, Fig. 11, 12 &13), though significantly underexplored area.

From a theoretical point of view, the model does provide insights and an overview of some important terms from the green business field. It explains how some predefined notions (such as BM, Green Innovation, Policy, GBMI and GBMs) may be interconnected and helps suggest how they could be affecting one another within a specific social setting; namely that of the process of GBM transformation. It is believed that such a model has not been created before, filling therewith an gap in a recently emerged and incomplete area of the business literature .

Lastly, the model has theoretical implications in the sense that it continues to provide support to certain established understandings. For example, it reaffirms the idea that innovation remains important in all forms of business if one is to achieve growth and remain ahead of competition. It also reiterates the significant role policy and policy makers have when it comes to aspects such as market creation and demand, financing, barriers to entry and exit, research and development etc. It can therefore be said that the framework created contributes to the enhancement of existing academic literary findings and inputs.

Chapter 6: Conclusion, Reflections & Further Research

6.1 Conclusion

Businesses are increasingly found at the centre of debates and discussions regarding sustainability, as they are often identified as both the cause of emerging environmental challenges, as well as the solution to them. This thesis has therefore focused on how organizations transform themselves into greener, more environmentally conscious units through implementation of GBMs, while having also considered the role of policy and policy makers in such undertakings.

The results achieved are based on the comparison of a GBM transformation model constructed in the literature review developed and the interviews conducted with members of the two case studies identified. The outcomes are limited in various respects (look at section 5.3.1), but are still thought to bear some validity and applicability. Therefore, with regard to the RQ presented, the findings indicate that ordinary BMs are transformed into greener ones due to the existence and emergence of green innovation, which alters the way in which value is created for the customers and how it is captured by the organization and its stakeholders. Further, it is suggested that policy and policy makers already play a large role with regard to the process of GBM transformation, and will possibly continue to do so in the future, as they lead to the enhancement and success of green innovation. Finally, green innovation and policy were found to be inherently linked, with one continuously affecting the other and vice versa, leading to the assumption that GBMI is a dynamic process.

However, one can say that throughout the research, analysis and discussion conducted, more questions have actually been created than answered. The limitations of the findings (e.g. with regard to the model created and the research methods chosen) lead to the conception of reflections and enquiries, suggesting the need for further research and development, in order to gain additional insights and more conclusive answers with regard to the given Research Question. The most prominent questions and identified areas for future investigation are therefore briefly presented in the next segments.

6.2 Questions and Reflections

Beyond the relevant findings with regard to the model developed and the predefined RQ, some questions have emerged upon reflection based on the outcomes of the interviews conducted and related to the areas of GBMs, GBMI, and the green business environment more broadly. With the limitations of the research methods used still in mind, these will be presented below, leading up to some suggestions for future research.

6.2.1 Do Green Business Models Really Vary from Ordinary Business Models?

One of the most introspective elements recognised in the answers of several interviewees was the lack of use of the term GBMs, together with the contradictory answers received as to whether or not they actually varied from ordinary ones. This raises the question of whether or not GBMs really are that different from more traditional BMs, or if the former notion is simply a minor adjustment/development of the latter?

Looking at section 2.7.1, GBMs have been defined as "*business models which support the development of products and services (systems) with environmental benefits, reduce resource use/waste and which are economic viable*" (FORA, 2009, pp. 8). In other words, they are BMs with a lower environmental impact than current, more traditional ones, caused by the development and enhancement of the field of green business, green innovations and policy. Based on this definition, one would assume that GBMs vary significantly from existing BMs and would carry noteworthy relevance with regard to the themes discussed in the interviews and the companies addressed. However, the interviewees never truly refer to the notion directly.

The project manager from Semco Maritime hints at the idea of GBM implementation by claiming that the ideology of the firm has changed over the years due to its entry into the green industry, which is noticeable in their choice of chemicals and the vast growth in number of employees working with sustainable projects. This could potentially be seen as an indication that the greening of the company's BM is noticeable, as modifications can be identified in the way the firm is going about its business now compared to before they entered the green market. Some similar remarks were also made by the other Semco Maritime A/S workers (e.g. the vice-president for wind, oil & gas stated that only 2-3 years ago there was no strategic plan for the renewables section, whereas now there is one), though again with no clear reference to the concept of GBMs.

On the other hand though, the Prospect Law Ltd interviewee is of the opinion that "[GBMs do not differ] *as much as I think many people would suspect – although they will to some degree. As above business models will likely be adapted to benefit as much as possible from sustainability but the underlying model in most cases will be easily recognisable*". On a similar note, Semco Maritime's vice-president did not consider his company's more traditional BM and the idea of a GBM to be significantly different either, while the innovation manager stated that: "*there is an overlap, but there is also a new part of the strategic plan... For us it was not like, it was not in our strategic planning, but it became a point after a while*". These perceptions seem to suggest that GBMs only form a mild variation of the more traditional BM formats, questioning therewith the diversity, significance and future influence of such green developments. That is to say, the interviews can be thought to denote that green innovations primarily lead to service and product changes (technological developments and BM adjustments), rather than entirely new, non-technological creations, such as GBMs.

Of course, the above assessment, which if true suggests further contradictions to the developed model, is once more based on the use of limited empirical data (look at segments 3.7 and 5.3.1). For example, Semco Maritime does not operate solely in the renewable energy sector, as it also has major operations within the oil and gas industry. This may explain why the firm might not find the idea of a fully green focused BM relevant (e.g. Appendix, Fig. 1 & 2), but instead considers the green changes made as an extension of what they are already doing. Also, the knowledge gap between the researcher and the interviewees with regard to some terms (e.g. BM definition and GBM understanding), as well as the language obstacles, might further explain the mixed reactions with regard to the idea of GBMs. Had different case studies therefore been used (e.g. in different sectors, from other countries, with varying BMs etc.), the outcomes might have been different.

Nonetheless, the limited mentioning of the GBM notion altogether, combined with the seemingly dissimilar definition and understanding of the term by the interviewees (as opposed to the definition presented in chapter 2), suggests that possibly more research into this area is needed to provide an answer to the questions raised and establish how far apart the two frameworks really are from one another. This would subsequently identify the long-term relevance of GBMs and provide depth to the field of GBMI.

6.2.2 Is the Notion of Green Business Models Limited?

Another emerging question upon reflection of the findings and the research completed is whether the idea and definition of GBMs itself is perhaps limited in some aspects, causing the restricted views on the matter by the interviewees. That is to say, GBMs as being presented currently could potentially have limitations that minimize the ideas applicability and business relevance.

For example, the results here seem to suggest that GBMs might only be relevant for organizations that operate fully within the green industry. On the other hand, companies that have aspects of their business in other sectors (e.g. Semco Maritime and their oil & gas activities) can only make minor adaptations to their existing BMs to green some products and processes and therewith enhance their image and brand. This of course limits GBMI and usage of GBM frameworks significantly, as they become of relevance to only a very specific type of organization.

What could instead be done, in order to increase the applicability of the idea of GBMs, is to establish more types of green oriented BMs – stretching the incentive and life cycle framework already in place - based on changes made in a company's existing BM functionality (e.g. enriched mobility and improved use of resources) and key processes (e.g. product, service and process innovation). This would increase the relevance of the concept of GBMs to more organizations, while providing support to the green business field and therewith leading to a rise in green growth, green innovation, green economy and sustainability. Examples of some potential types of GBMs, based on a study done by the OECD (2013), can be seen in the Appendix, Fig. 14.

Furthermore, one must also bear in mind that the research already conducted on GBMs and GBMI is very minimal and that the concepts are neither widely used nor extensively distributed amongst firms. On the other hand, one could argue that the small number of publications that do exist and which do support these notions can be assumed to be developed and reinforced by people, organizations and institutions that wish to gain from its emergence and application. Thus, it can be presumed that the idea of GBMs might be limited in the sense that it may have been overhyped or has been somewhat misguided by these parties, causing confusion about its actual role and implication for firms. Though no evidence of such actions has been found throughout the research stages of the thesis, it forms another consideration worth some future contemplation.

6.3 Suggestions for Further Research

While a lot of ground has been covered regarding the notions of GBMs and GBMI, there is still a lot of work to be done before truly understanding these concepts and what it will take for firms to transform their existing business models into greener alternatives. Some final ideas for further research, based on the findings, limitations and the above reflections are revealed here.

If we are to assume that the same RQ and model are to be re-investigated, the research methods used will obviously have to be altered in some respects from the ones chosen here. A much larger amount of companies, placed in different sectors of the green business field, will need to be approached in order to retrieve more reliable data. Companies that have already implemented a GBM or are in the process of doing so would be of particular interest. Also, a combination of quantitative research and qualitative methods might enhance transferability, confirmability and dependability of the empirical data to be gathered and any future models or frameworks to be developed (Bryman & Bell, 2007).

Aside from improvement of the research methods selected (which is a suggestion very specific to the context of this thesis), to gain a more complete view of GBMs and their transformation, one must also look at relevant aspects and questions that have not been considered yet. Elements such as the financial side of green focused business model innovations, the differences they actually bring about to an organization, establishment of the pre-steps that foster green innovation, identification of current limitations of the notion of GBMs, potential degrees of greenness, development of more types of GBMs and consideration of the benefits in terms of image and marketing for companies that undergo GBMI, are all of importance when addressing GBMs and their transformation and must therefore eventually be explored. The outcome of research in these areas could complement and lead to the further development of a GBM transformation model, while also contributing greatly to the green business field in large.

Finally, from a policy perspective, additional exploration is needed in order to identify promising policies supporting GBMI, green innovation, green growth and the creation of a green economy, as the amount of eco-related policies in business remains rather limited (Appendix, Fig. 5 & 6). More than this, contexts in which these specific policy instruments can be deployed in effectively have to be examined as well. Furthermore, adjustment and regulation of policies due to the emergence of future green innovations could also be worth some closer examination.

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Chapter 8: Appendices

Appendix A – Figures

This part of the Appendix presents all the figures used and referred to throughout the thesis, which are not found in its main body. Though many of them have the format of a table, they are all denoted as Figures for the readers' convenience.

Functional Sales (FS)	Functional Sales (also called Product Service Systems, PSS) enables the customer to pay for the functionality or result of the product as a service instead of buying the product itself, e.g. leasing or product sharing.
Energy Saving Companies (ESCO)	An ESCO provider optimises customers operations in e.g. buildings and in return gets paid according to the savings achieved. The customer does not have to pay up front and pay less the less is used of the service.
Chemical Management Service (CMS)	CMS is a business model based on a long-term contract, where the supplier of CMS accepts the responsibility for managing chemicals of its customers and strives to reduce the associated costs and risks.
Design, Build, Finance, Operate (DBFO)	DBFO companies undertake capital-intensive long-term construction projects where private finance, construction, service and/or maintenance are bundled into long-term contract of typically 20-30 years.

Figure 1: Incentive models (Taken from: Bisgaard T., Henriksen K. & Bjerre M. (2012); "*Green Business Model Innovation: Conceptualization, Next Practise and Policy*"; Nordic Innovation Publication)

Green Supply Chain Management (GSCM)	GSCM is an integrated concept of greening activities in the supply chain focusing on upstream flow, cost reductions of and innovation in raw materials, components, products and services.
Take back management (TBM)	TBM extends the producers responsibility of waste management through take back mechanisms of the down-stream use of the product. This includes manufacturers, retailers, consumers and recyclers.
Cradle-to-cradle (C2C)	C2C designs innovative and essentially waste free products that can be integrated in fully recyclable loops or biodegradable processes. C2C focuses both up-stream and down-stream in the value chain.
Industrial Symbiosis (IS)	IS is a shared utilization of resources and by-products among industrial actors on a commercial basis through inter-firm recycling linkages. The aim of IS is to reduce costs and environmental impact of participating companies and municipalities.

Figure 2: Life cycle models (Taken from: Bisgaard T., Henriksen K. & Bjerre M. (2012); "*Green Business Model Innovation: Conceptualization, Next Practise and Policy*"; Nordic Innovation Publication)

Incentive Models	Key Barriers
Functional Sales (FS)	• Large investments (long-term) tied up in products. • Complicated to involve other companies in value chain. • Internal company organization. • Current accounting practises. • Traditional mindsets. • Bonus systems for the buyer.
Energy Saving Companies (ESCO)	• Large operating investments for company. • Large refurbishment investments by customers. • Long payback time for customers. • Uncertainty about savings for customers, and financial institutions. • Lack of capital for initial investments and for smaller projects since there is a competition for scarce capital with more traditional investments.
Chemical Management Service (CMS)	• Difficult for customers to identify costs linked to chemical usage, handling, disposal etc. And thereby savings with respect to a service supplement from a CMS company. • Long-term contracts deter customers. • Variable chemical usage makes it hard to determine fee. • Lack of customer knowledge about the business model.
Design, Build, Finance, Operate (DBFO)	• Lack of flexibility due to long-term contracts. • Complex procurement process for the public sector. • Private capital might be more expensive than public capital. • Lack of insight into environmental impacts. • Uncertainties concerning the calculation of risk among customers.

Figure 3: Barriers for incentive models (Taken from: Bisgaard T., Henriksen K. & Bjerre M. (2012); "*Green Business Model Innovation: Conceptualization, Next Practise and Policy*"; Nordic Innovation Publication)

Life Cycle Models	Key barriers
Green Supply Chain Management (GSCM)	• Lack of financial and human resources. • Costs for improving GSCM have a long payback time. • Difficult for company to link cost to savings and effects in the internal process. • Smaller customers may not have the necessary purchasing power to influence suppliers' products or production processes.
Take back management (TBM)	• Complicated logistics of used or obsolete products. The transportation needs to make economic and environmental sense. • New design to enable recycling of products. • Use of new types of materials that can be recycled. • Investments in new machinery. • Unwillingness to share information on chemicals and materials. • Current accounting practises.
Cradle-to-cradle (C2C)	• Complicated to involve other companies in value chain, e.g. suppliers. • Unwillingness to share information on chemicals and materials. • Sometimes large investments in materials, technology and recycling infrastructure is necessary. • Lack of competences and knowledge at the upper management level. • Insufficient case references. • Higher costs involved in switching to other suppliers.
Industrial Symbiosis (IS)	• Difficult for companies to identify synergies between themselves (high search costs). • Lack of trust between companies and unwillingness to share information on production processes. • Lack of available recovery technology to transform by-products into resources. • Need for substantial investments in infrastructure systems within the IS. • Lack of knowledge in companies and public authorities.

Figure 4: Barriers for life cycle models (Taken from: Bisgaard T., Henriksen K. & Bjerre M. (2012); "*Green Business Model Innovation: Conceptualization, Next Practise and Policy*"; Nordic Innovation Publication)

Business Model	Existing Policy
Functional Sales (FS)	N/A
Energy Saving Companies (ESCO)	Federal Energy Management Program, US Green Deal, UK ESCO Light, DK Decoupling Policy California, US
Chemical Management Services (CMS)	Registration, Evaluation, Authorisation and restriction of Chemical Substances, EU
Design, Build, Finance, Operate (DBFO)	Private Finance Initiative, UK

Figure 5: Existing policies regarding incentive models (Source: Henriksen K., Bjerre M., Øster J. & Bisgaard T. (2012:A); "*Green Business Model Innovation: Policy Report"*; Nordic Innovation Publication)

Business Model	Existing Policy
Green Supply Chain Management (GSCM)	N/A
Take Back Management (TBM)	Waste electrical and electronic equipment, EU
Cradle to Cradle (C2C)	Cradle to cradle network, EU National Waste Management Plan, NL
Industrial Symbiosis (IS)	Industrial Symbiosis Kalundborg, DK National Industrial Symbiosis Program, UK Kwinana Synergies Project, Australia

Figure 6: Existing policies regarding life cycle models (Source: Henriksen K., Bjerre M., Øster J. & Bisgaard T. (2012:A); "*Green Business Model Innovation: Policy Report"*; Nordic Innovation Publication)

Policy Challenge	Policy Options
Insufficient demand for green innovation	• Taxes and market-based instruments to price externalities and enhance incentives • Demand-side policies, such as public procurement, standards and regulations in specific markets and circumstances
Lack of innovation capability	• Broad-based policies to strengthen innovation
Technological roadblocks and lack of radical innovation	• Investment in relevant R&D, including thematic and mission-oriented research • International co-operation
Research and investment bias to incumbent technology	• R&D support, tax incentives • Adoption incentives/subsidies • Technology prizes
Lack of finance	• Co-investment funds • Market development
Regulatory barriers to new firms	• Regulatory reform • Competition policy • Front-runner approaches
Lack of capabilities in small and medium size enterprises (SME) to adopt green innovation	• Access to finance • Skills development • Linking SMEs to knowledge networks • Improving information supply • Reducing regulatory burdens
Non-technological innovation	• City and transport planning • Regulatory reform
International technology transfer	• Development of capabilities • Trade and investment policies • IPR protection and enforcement • Voluntary patent pools and collaborative mechanisms

Figure 7: Possible policies to foster green innovation (Source: OECD (2011:B), "*Fostering Innovation for Green Growth*", Green Growth Studies, OECD Publishing)

Identified Term	Definition (as chosen for this paper)
The 'Green' Concept	Businesses which "*have made efforts to introduce low-carbon, resource-efficient, and/or re-manufactured products, processes, services and business models, which allow them to operate and deliver in a significantly more sustainable way than their closest competitors"* (Ernst & Young, 2008, pp. 4).
Business Model	"*How value is created for the customers and how value is captured for the company and its stakeholders*" (Henriksen et al, 2012:B, pp. 14).
Innovation	"*Innovation is the specific function of entrepreneurship, whether in an existing business, a public service institution, or a new venture started by a lone individual."* Furthermore, innovation is the means by which one "*either creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth.*" (Ireland et al, 2009, pp. 370).
Green Innovation	The *intentional* creation of new or the significant improvement of existing green products or processes that reduce environmental impacts and/or reduce the use of resources throughout the lifecycle of related activities (based on the works of Henriksen et al, 2012:B; Chen, 2008: A, B; OECD, 2011:A; OECD, 2009).
Business Model Innovation	"*What enables a firm to uniquely deploy available alternatives with respect to product, technology, process and markets with a view to create new value propositions and appropriate value arising out of the competitive advantage.*" (Henriksen et al, 2012:B, pp. 17).
Green Business Model	"*Business models which support the development of products and services (systems) with environmental benefits, reduce resource use/waste and which are economic viable*" (FORA, 2011, pp. 8).
Green Business Model Innovation	*"... The non-technological green innovation in and between companies which change[s] the core business [of a firm] from selling a product to selling a (full) service and at the same time retaining ownership of the product and responsibility for its functionality.*" (FORA, 2011, pp.1).
Policy	A course or principle of action adopted or proposed by an organization or individual (http://oxforddictionaries.com)

Figure 8: Overview of definitions of main terms/notions used in the paper.

Focus of Questions	General Guiding Questions
Information about Semco Maritime A/S and the interviewee.	- What is your position at Semco Maritime A/S and what does it entail? How long have you been involved with the organization? - Can you provide a short description of Semco Maritime A/S? What does the organization do and stand for? - How does Semco Maritime A/S separate itself from other companies with a similar focus?
How Business Models are transformed into Green Business Models.	- How would you define the term Business Model? - Is there a difference in your view between a traditional Business Model and a Green Business Model? If so which? - How does a company in your view become more green and sustainable? - What is Semco Maritimes' A/S Business Model? - What green/sustainable aspects is Semco Maritime A/S involved with? Examples? - Do you think innovation plays a role for firms with a green/sustainable focus? If so how? - Is innovation relevant for Semco? If so how, and how is it related to its Business Model? Examples? - How do you see the future of Green Business Models? What is needed for them to be implemented correctly and remain relevant?
The role of policy and policy makers with regard to green business.	- In your view, do policies/regulations/governments have an effect on the way green oriented firms conduct their business? If so how are they affected? - Have policies altered the way Semco Maritimes' A/S (or the way your department) conducts its business over the years? Examples? What effects has that had on the company's Business Model? - What can be done from a policy perspective to support green businesses and sectors? Examples for Semco maritime A/S?

Figure 9: General questions/themes used for interviews with the employees of Semco Maritime A/S.

Figure 10: Summary of Semco Maritime market sectors (Source: Semco Maritime Company Booklet, 2012; www.semcomaritime.com)

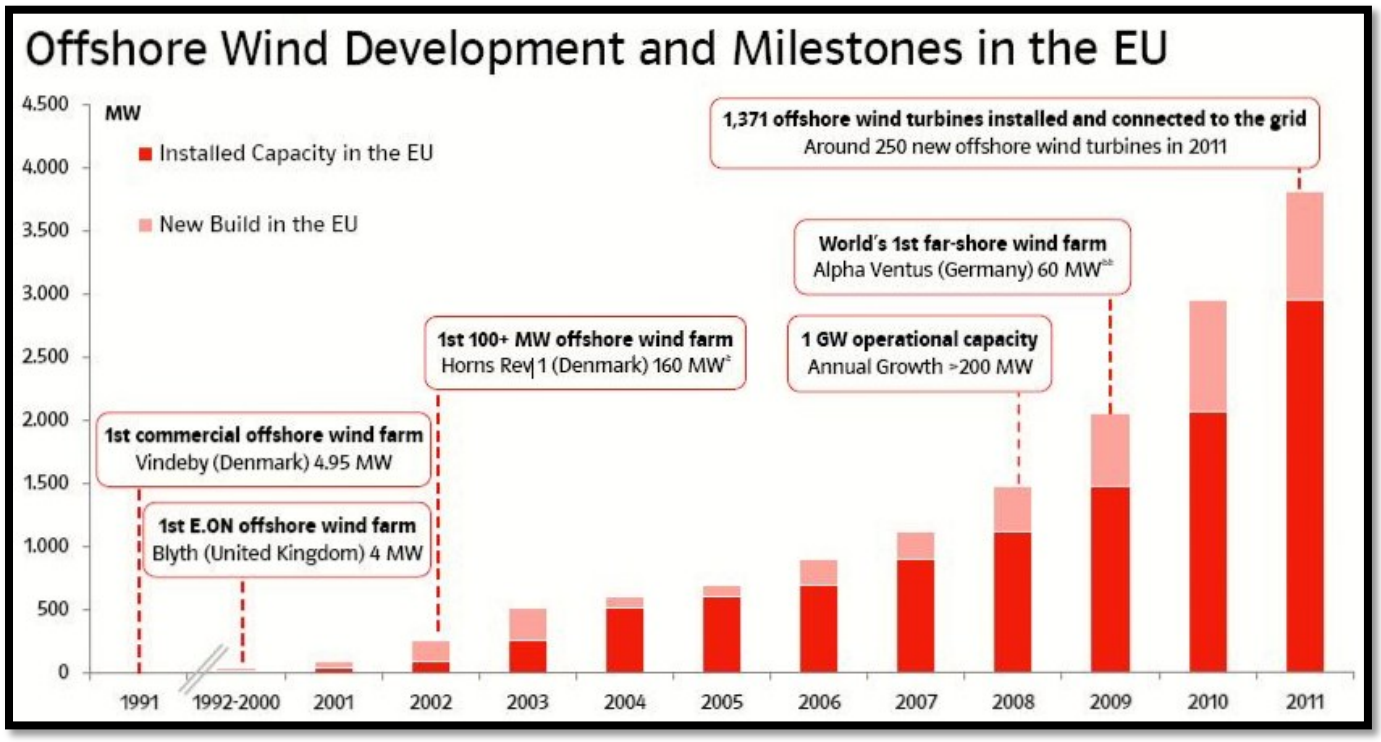

Figure 11: Development and milestones of offshore wind development in the EU (Source: E-On (2012); "*E.ON Offshore Wind Energy Factbook*"; E.ON Climate & Renewables PowerPoint Presentation, September 2012)

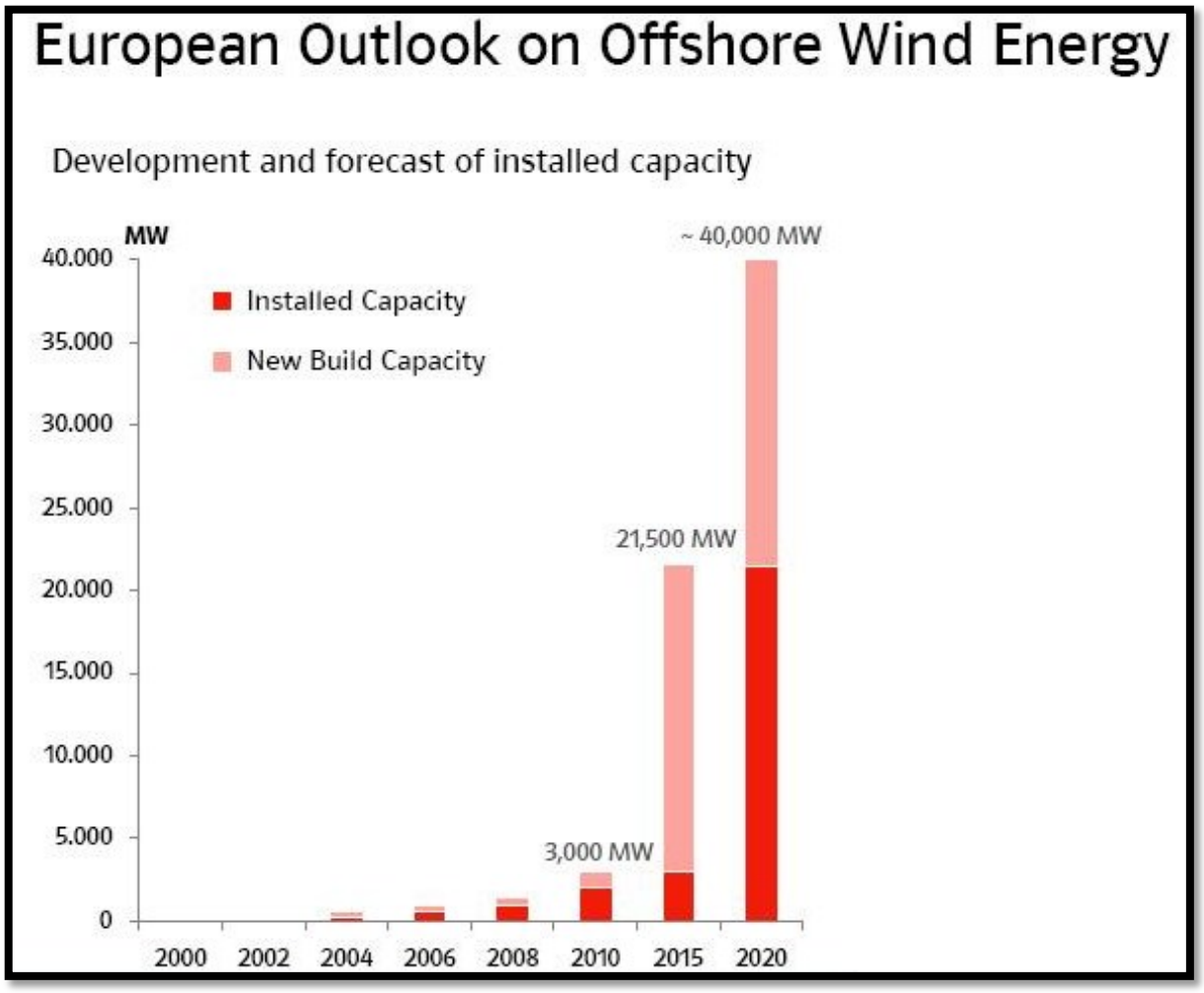

Figure 12: Outlook of future offshore wind energy development in Europe (Source: E-On (2012); "*E.ON Offshore Wind Energy Factbook*"; E.ON Climate & Renewables PowerPoint Presentation, September 2012)

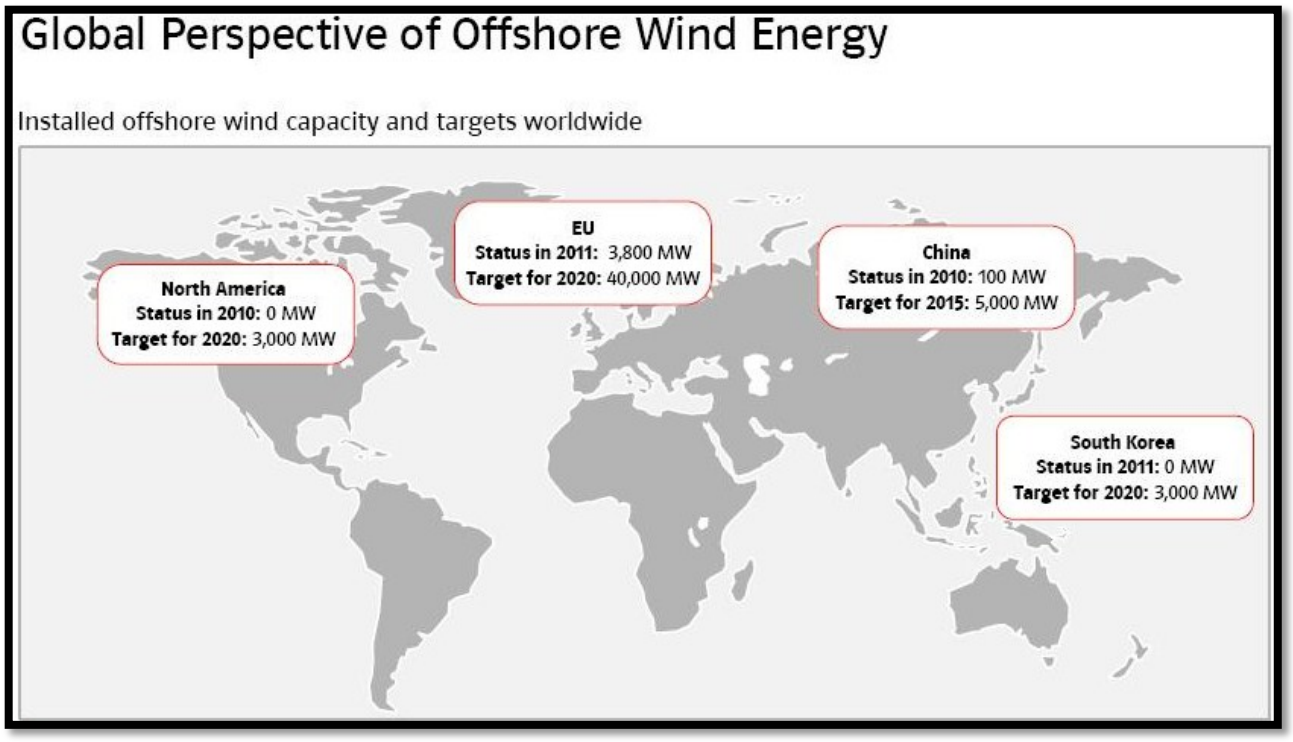

Figure 13: Outlook of installed offshore wind capacity and targets worldwide (Source: E-On (2012); "*E.ON Offshore Wind Energy Factbook*"; E.ON Climate & Renewables PowerPoint Presentation, September 2012)

Examples of Green Business Model Types	Definition
Greener products/processes based business models	Here, a diverse set of innovative products and processes is applied in companies that achieve better environmental performance by, for example, saving resources and minimizing emissions and waste.
Waste regeneration systems	Re-use or recycling of waste as new products. This business model is focused on valuing waste, or using it as an input for a new product to be sold on the market.
Alternative energy based systems	This includes a wide range of applications, products and systems based on renewable energy deployment. Business models using these systems can be focused on sales or offer a technical service.
Efficiency optimization by ICT	ICT technologies provide a wide range of solutions for energy and resource use control, establishment of smart grids, cloud computing, as well as teleconferencing and online shopping.
Innovating financing schemes	They represent long- and medium-term investment arrangements often focused on the improvement of environmental performance, which is also linked to economic performance.
New sustainable mobility systems	They are alternative transportation schemes with a reduced environmental impact. Examples include more efficient and cleaner public transport systems, car or bike-sharing/renting models and schemes for increasing the application of electric or bio-gas based vehicles.

Fig. 14: Some examples of more green business model types (Source: OECD (2013); "Why New Business Models Matter for Green Growth"; OECD Green Growth Papers (2013), OECD Publishing)

Appendix B – Interviews

This section of the Appendix presents the transcriptions from the three interviews conducted with the employees of Semco Maritime A/S, as well as the emailed response given by the Prospect Law Ltd representative. The letter Q (Question) refers to the researchers' inputs, while the letter A (Answer) represents the interviewees and their responses.

Interview 1 – Engineering Manager; Semco Maritime

Q: Ok. Would you please be so kind to tell me what your position at Semco is?
A: Yes. My position at the moment is I am an engineering manager, so I take care of the engineering works for different projects. I am responsible for the engineers do their job to the time and all dates between all disciplines.
Q: Ok. How long have you been working for Semco?
A: 27 years.
Q: So you have been here since one of the beginning stages of what the company has become?
A: Yeah. Since '85 and the company started in Esbjerg in '82 I think.
Q: Yeah, ok. Excellent. Could you provide me with a short description of what Semco is, what does and what it stands for?
A: Semco is a company that make projects, carry out projects. We have also some products we make but mainly its projects where we receive tender materials and then we make a quotation and if we are lucky we get the order and then we start up. Sometimes it is includes design, sometimes it's only procurement and instillation and test and so on.
Q: How do you feel Semco is different from other companies doing the same thing? Is there something special about Semco that differentiates it from other engineering companies?
A: Our advantage is that we, beside the instillation, we also have the engineering phase. So not only blue collar, it is also white collar people in the same company. Other company in Denmark have to go to a consultancy agency to have the engineering made. We can do it in house; we can do it in house for nearly all disciplines.
Q: Ok, very good. Business model; we are going to talk a bit about business models.
A: Yeah.
Q: How would you define a business model? What does that term mean to you?
A: I'm a little hmmm; I'm a project man, so in my eyes a business model will lean on projects. So, there will be, in Semco we have what we call the project model. So, we carry projects out the same way every time. So, that's what I would think is the business model. I think you are looking for another explanation, but in my eyes it is like this.
Q: No no, not at all. Yes, yes it's your way of doing things. It's a pre-described way of doing things and you follow that.
A: Yeah, yeah.
Q: Do you think there is a difference between a company that does not work in projects like Semco does, and that does not approach some green matters? I know Semco does some very

environmentally friendly work, they follow some ISO protocols, they have gotten awards before. Do you think there is a difference between the way Semco works/does its business and its projects and companies that don't have a green focus at all?
A: Of course there are, of course there are. But we have hmmm; it's a little odd but we are, we started in the oil business. And the oil business is black work, but there is focus on the green side as well and we are educated in of course the quality work and also the environment and safety side of it. So, every company that work have worked in the offshore oil business. I think in the same way as us that are very keen at the green side of the project.
Q: And how does that affect the project itself when you have to think green? Does that change things a lot for you? Is it a big factor to be green aware?
A: No. Sometimes we receive tender materials where they describe we shall have a count, what we use of materials so you can make a green balance. So, in the end that calculation is so big so normally it end up that not be done at all.
Q: Ok.
A: But the intend is there and is not only for green projects. It can also be, I have also seen for oil projects as well.
Q: Ok. So, it goes all around in that sense?
A: Yeah, yeah.
Q: So, how do you, you described to me that in your view Semco's business model is divided in projects, so it is basically the way you approach different projects and descriptions.
A: Yeah, yeah.
Q: Are there any examples of purely green projects that you have been involved in with Semco? I'm thinking a type of chemical injection systems develop or matters that just have to do with the green industry.
A: Yeah, we build a lot of substations for the windmill industry, so if that's not green, then?
Q: Yeah, is that any different those projects, do you approach them any differently than you do for example power stations projects or rig projects?
A: No, it's the same.
Q: It's the same?
A: All rig projects is in the oil business.
Q: Ok.
A: But the, if you have a normal oil and gas fixed platforms' topside there is no different between the way we do that and the way we make a substation for an offshore windmill farm. It's the same.
Q: It's the same methodology you follow?
A: Yes, yes.
Q: Ok. Do you think innovation plays a big role for a company like Semco, in all the projects they are involved in? How important is innovation?
A: It's very important because all project cost. We have to, we have to think. Sometimes we are chosen because of course we have done it before or we see the project in another way than the

customer do in the first place. So, innovation is, I think is very important also for develop new methods and taking in some new products and materials and so on, to make the work easier, to make the project more cheap and that way.
Q: Ok. Obviously innovation is very relevant to Semco. I have been on your website and seen all the projects you work with, they are very innovative in many ways.
A: Yeah, yeah.
Q: Is it part of the company's mentality? Is it part of the way, as a Semco employee, I have to be innovative, this is part of me, this is part of the company? Or is it something that is more like enforced rules, business models etc.?
A: Personally I think it is my responsibility to be, to innovate and act like this because I also think it is very exciting to work with. If you everyday have the same boxes to fill out it will be boring, but if you can go out of the box and make some new things, I think that is some of the stuff that is driving me also to be here 27 years, so.
Q: Now, in your opinion, if we talk, take the Semco bit aside, if we talk green business model – companies that operate green – what do you think is needed for them in the future besides innovation to remain green? How would Semco for example develop more environmentally friendly products in the future? Is innovation the only thing driving it or what else can have an effect on that in your opinion?
A: You say yourself we are certified to a lot of ISO standards and those standards and certifications is part of the brand and part of the parameter the customers have chosen us besides of another company. I think that we have to be at the beat, in front, because otherwise you will be a grey, conservative, not-excited company. The green way is also a buzzword so that you can be attractive for new employees and so on.
Q: Do you think being more green is the future?
A: Yeah.
Q: It is important to attract customers and employees etc.?
A: Yeah, yeah.
Q: And do you think that will have, say 10 years from now, 5 years from now, how do you think that going more and more green, how do you think that will affect Semco in the way it operates today? I mean, do you see a difference from when you started here in 1985 and until this point today? Has Semco's ideology, business model and approach to things changed because of the green element?
A: A lot of, yeah yeah. A small example.
Q: Yes.
A: When I started here we have one wastebasket in the office and now we have one for paper, one for not paper, one for batteries and so on. And the way to handle the waste is one thing and also the way we handle chemicals and the way we are choosing chemicals. The best chemical is also the most poisonous and that's a fact. But we chose one for the environment, the best one for the employees and we all the time develop and look for more green products and products that are safe to use.

Q: Does that limit you in any way, the fact that you have to be environmentally aware? It's a sensitive area; you know the oil industry is very sensitive. So, my question is, does that change a lot of things for you that there has been more focus on the green element recently?
A: Yeah. No, it's a challenge so we think that way. It's kind of our way to doing it is if you have it on your backbone…
Q: It's your identity?
A: Yeah, yeah, yeah.
Q: To something relevant but slightly different, how do you think policies and governments, for example the Danish government, has that had an effect on your way of doing business? I'm thinking of taxation especially on non-green matters, companies operating more greenly have a reduced tax setting in Denmark and other regulations that go through the government. Has that had an impact on Semco?
A: Yeah, I think yeah. They had and they will in the future as well if you are able to save some money to be green, your image, is a win-win situation. You can got money and you got better image in the market so, it think that's yeah.
Q: Is it a driving force?
A: Yeah, yeah.
Q: Are there any limitations, are there any rules or regulations that are put through governments that have a negative effect, not only on the green factor, but in the way you generally do your business?
A: Not in my knowledge, no. But I think, if a government come with some rules and put them over your head is not the way to do it. You have to motivate people, it is much better than coming with rules and standards and so on. Motivation is better.
Q: Do you think some of the operations Semco has, like there is the big focus on the environment, at least on the website, and on corporate social responsibility particularly. Do you think these would be as important to the firm if there wasn't a buzz about this green, this whole sustainable focus? Do you think it is something that comes because it is a trend or do you think it is naturally incorporated in some firms to operate in that way? I know, it's a tough question.
A: If we go way back…
Q: I mean the question is basically, do you think governments are the ones trending companies to become more green or do you think it's just the business world by itself that's discovering that there is money in this?
A: It is a very big question because, if the government do nothing and the television and the internet is not hyping the green thing we would go around in smog and dirt I think, yeah.
Q: So it does have an effect?
A: Yeah of course it does.
Q: Excellent. And final question, as we are closing it down slowly. What can be done by governments, in your opinion, in the future to enable companies to become more green? You can use examples particularly for Semco or just generally in your opinion, what for you would be

important for the green sector to develop for companies to focus more on green elements? I mean taxes for example have been adjusted already.
A: Yeah, yeah.
Q: But is there something else that could motivate companies to become more green in the future?
A: If, for example if we get the power, the green power cheaper. So if we make a substation for an offshore windmill park we can document that all the power we buy is from windmills, wind farms, then we got it cheaper. Then off course the whole project would be more green and we will be more competitive in the market and that will bring Denmark as a green country in front I think. And there is a lot of branding in it and image if we have some self produced power to the office milieu. There is a limit, but it will brand the company in the good way I think and it'd be very exciting to work with and the thought about the green power, I think that would be, that would motivate companies to go to use power produced by wind turbines and so on and that would set requirements to install more wind power and gives us more to work with, making it a win win win situation.
Q: So there will be jobs created all around and benefits created all around?
A: Yeah, yeah.
Q: Do you think it's possible though? Do you think it'll happen? I mean the green industry has suffered in recent years since the crisis. You can look at Vestas for example, and as the most local example, that they are suffering partly due to it and a bunch of other reasons. But do you think there is a future in the green industry? Do you think it is important for governments to keep a focus on that factor?
A: We have to use it, we have to be focused on it because the resources oil and gas is limited. So, we have to find another way to do it. We use a lot of energy every day, so we have to find another way to get our energy. It can be from wind, it can be from the sun, it can be from the waves and so on. So we have to do it that way.
Q: How about Semco? Have you seen it change in the time you have been working here, going from the more raw natural resources to the unlimited ones, to the green ones? Has there been a bigger shift in the past 25 years that you have been here from oil and gas towards hydropower and wind power? Is it taking more and more of the research and development resources, the projects that are coming in are coming more and more from that sector? There is a positive trend you would say in that direction?
A: Yeah, yeah, yeah. For example, in the last 1,5 years the number of employees that are working with green projects is grow from around 10 to 50 I think.
Q: Wow, that's a huge percentage increase.
A: Yeah, yeah and the curve is going up, up, up.
Q: Ok, I think that's about it at least for now, so I say thank you very much for your time.
A: You're welcome.

Interview 2 – Innovation Manager and Strategic Planner of Offshore Wind Power; Semco Maritime

Q: Hello. Let's start out by giving me your name and what your position is at Semco.
A: My name is Søren Jul Nielsen. My position is innovation manager. Besides from also being innovation manager, I am also responsible at Semco Maritime for communication of our strategy and in a more detailed way the strategy for our offshore wind activities. I'm involved in the strategic planning as well on a more detailed basis.
Q: How long have you been involved with Semco?
A: Since 2006.
Q: Ok. Could you provide me a short description of what Semco Maritime does and stands for?
A: Yep. Semco Maritime is an entrepreneurial and also a consultancy engineering company, dealing mainly in activities in the energy market. We can do everything from the detailed engineering and until construction and instillation.
Q: How, in your view, does Semco separate itself from other companies with a similar focus?
A: Semco Maritime has started out in the beginning as an electrical instillation company and has evolved from being a more hands-on company until today where we can do everything from detailed engineering, feat engineering until the whole project scope with construction and instillation. The range of activities that we can do in Semco Maritime is the whole nine yards. Most companies have either the engineering part or some companies only have the fabrication part, some companies maybe only have the instillation part, where Semco Maritime we have the whole scope of the project from the engineering, from the detailed planning, from the feat studies, until the fabrication and installation and after services.
Q: Excellent. Now, in your opinion, how would you define the term business model? What does that mean to you?
A: The?
Q: Business model as a concept.
A: In Semco Maritime, the business model in Semco Maritime is integrated in our strategic planning. So, when you look, we don't call it a business model; we call it our strategic planning. Inside our strategic planning we have the business model as well where we look at the strategy, for example on a geographical term where do we want to operate, we look at who are our customers, we look at what kind of products or services would we like to provide within our company, we look at what kind of markets we would like to work with. So, that could be for example, when you look back 10 years in our company, our strategy and business model was to only work in the oil and gas industry. However, when it turned out some of the jobs when doing the offshore wind parks were very similar for us building gas instillations in harsh environments in the North Sea. When you are going to build transformer stations for offshore wind parks was very similar to what we did, but we said we didn't want to be involved in all that wind activities, we only wanted to focus on the oil and gas. However, it's the same competences that you use to build transformer stations for the wind parks and suddenly when a lot of our customers asked us if we could do this we changed our focus to not be only on the oil and gas. Today we have a very

strategic plan for actually being a player within the offshore wind market so, that when you look at that from our business plan and the strategy in our company is quite the same thing.
Q: Do you see your strategic plan, or the business model/strategic plan from a company that has a somewhat green focus, like Semco Maritime does in many of your sectors, and when it does not? Do you see a big difference there? Do you think a business model of a company that does not associate with this at all is very different than one that associates with the green industry?
A: Yeah. Of course there are some overlapping, because since there is overlapping that's why it's a strategic good move for us, since there is some overlapping in the competences and in project planning, project management, in dealing with the components that you use when you do offshore instillations. You can't just use switches and electrical instillations that you use onshore. When you are offshore you have corrosion problems and since it is a very harsh environment, so there is a lot of knowledge that we have from the 30 years of doing instillations in the oil and gas industry that we can actually transfer directly to the offshore wind parks. However, there are some of the customers that today who are the same, for example Dong Energy, they are one of the very active players in Denmark building offshore wind instillations both in Denmark, in the German, in the UK sector, and now they are moving also to France to do offshore wind park projects. So, and Dong Energy they also own oil and gas instillations in the North Sea. So, since they are also overlapping, when we do green projects it's actually some of the customers are the same. However, there are also some customers who we only deal with the green projects. So, we need to look at the market in a different way than when we only did oil and gas instillations. Now new players, new customers has been presented to us.
Q: So that changes part of your strategic view?
A: Yeah. Of course there is an overlap, but there is also a new part of the strategic plan and as well as when you talk to Hans Henrik (interview 1), on the technical side there are different specifications and different rules and regulations that you do on the offshore instillations for wind energy, rather than when you do oil and gas instillations. So they are different issues that we need to learn in our company when you work in the green market or with the green customers.
Q: What do you think the main difference is, where do you think the difference lies in a green business model from a normal business model? What do you think it comes down to? How do you think ones moves from, what is the main thing that makes Semco go from not associating with the green to going into the green? What forces it?
A: If you look back 10 years ago, the market didn't look as it was going to be very big. It's not more than 20 years ago when people were building wind turbines. It was like a philanthropically, experimental thing and not big business. Today it's a billion DKK business, and of course, from our point of view, being an engineering and construction company and an entrepreneurial company it evolved to be something very big and that's why for us it starts to become extremely interesting for us. For us it was not like, it was not in our strategic planning, but it became a point after a while because the business is now going to be very very big. And maybe a couple of years ago we turned over, if we were lucky, we turned over 25 million Danish kroner on the wind

market, on the green energy. Today, we have a strategic business plan that in 2015 we should turnover more than 500 million Danish kroner in a year within this area. So, the expansion of this is enormous and the potential in the market is enormous.
Q: Do you think innovation plays a big role in this as well?
A: It does very much. Just building the transformer stations and having the experience on building these transformer stations to be able to sit in this offshore harsh environment has a lot of things to do with innovation. You have to be a very innovative player, because a lot of things, since this is a very new market you have to start and do things in smart and better ways and trying to lower the cost, because for the offshore wind farms in the future to survive you have to be able to every time you build a new transformer station to go offshore to cut the costs and to be more effective. For the time being I think that Semco Maritime has built more than 50% of the offshore transformer substations in the offshore wind parks that has been built in the world. So we are market leader within this area and of course this is to be an innovative player and have our engineers to be innovative in the way that we built these instillations. If we are not innovative or we do not improve or at least have a, maybe not a radical innovation but an incremental innovation that every time we built the next one we learn, we do better, we built it cheaper, we built it better, we use better materials, more reliable materials. So every time we have to do things better than we do, otherwise we will not be able to turn over more than 500 million in 2015. And thus we have to be on our toes to be the market leader.
Q: Would you say that this is something that is engraved, the fact that you need to remain innovative and ahead of the curve, do you think that is something that is engraved in your strategy or strategic views, business model or business plans?
A: It's engraved in the company, it's engraved in our business model and in our strategy. If you do not have an innovative company you will stand still in your development and in these days, in this market that we are in today if you stand still it is the same as going backwards. So, other companies who are smarter and more innovative will overtake you within very short time. So, you have to be extremely innovative since our company and most of your turnover is built on people knowledge and people. We don't have big machineries, doing big fabrications things. So, most of our turnover in our company is people and knowledge. So, if we are not innovative, this company will be worth not very much money within very short time if we don't drive the innovation in the company and have people think innovative in the way that they work, think innovative in the way that we do our Semco Maritime project models, think innovative in the way that we do our project planning and our project management. If we are not always improving this, our company will not last in this market for very long.
Q: Do you think innovation is a big factor for companies going green?
A: Innovation is the main factor, not only for us as a company, but for Denmark as world leaders within green market. We have to be innovative because we are not the cheapest fabricators in the world or we do not have the cheapest labour, so innovation and thinking ahead and being the best in the world it has to be our main driver. If we don't do that I think we will be taken over by the

Chinese and people from India. So, we need to be really really really driving the innovation, otherwise we will be left behind.

Q: Do you think the green sector, more specifically sustainable business model or green business model, do they have a future in your view and what is the most important thing to keep in mind for the future for such a sector? I mean for the renewables sector at Semco for example?

A: For us, we have two ways of thinking. We have the way of thinking that we have the part of the company that deals with oil and gas with the fossil fuels and we have another part in the company, which deals with the green energy. It's very important for us to tell the world that you cannot generate the amount of energy, just only having renewable energy. It's important to know that we need the fossil fuels also to make the world go around and requirements that are in the world for energy is very high and it will be going up over the next years, maybe not in Europe, maybe not in the US. In the more industrialized parts of the world they are cutting down on the energy so maybe those markets will be status quo. But markets like India, like China, the requirements for energy will be going up dramatically. Africa will be going up dramatically. Everybody will like to have a cell phone and a TV, and the more they develop, the more requirements for energy there will have. So, for our company it is important to look at the market as whole thing, not only at the renewable energy, but as a spectrum of actually being an energy supplier in the world in this market, to perform great delivering renewable energy, but also make sure that we do the fossil fuels as well to be able to meet the demands of energy in the world. So, we are not only dealing with one side; we are dealing with both sides, wanting to drive the renewables as much as we can, but also having a more realistic view that we need to meet the energy demands in our world today we need fossil fuels as well, but to do it as clean as possible, do it as cheap as possible, but we cannot look at the world to only have renewables. We need the fossil fuels as well.

Q: But there is a future in the renewables sector, the green sector?

A: There is a huge future. And today we are dealing with offshore wind parks. I think the next big issue will be looking at wave energy and maybe for tidal energy, you know where you put turbines on the water that gets energy from turbines sitting and doing when the tides go in and out and then catching the energy from that. I think we haven't seen the last of that. I think, as before, when we go 20 years back you looked at the wind turbines, they were just philanthropical projects, as the wave energy is today, but I think it will be very very big. Solar energy is also going up, it's growing dramatically. Germany has huge solar parks, as when we drive through Germany today. So, I think the wind turbines and after that you will have the wave energy and then you'll have the tidal energy will also be big.

Q: Ok. So, let's see. Yes, so the green focus, you know you talked about strategy, that Semco does include the environment, the sustainable thought, that corporate social responsibility is part of the business model and strategy. What is, in your view, what is the most important thing to get this implemented correctly? Because, you know, companies go through, as you said Semco didn't focus on that sector 15 years ago. What do you think the most important thing was and still is for companies that are moving from the normal, if you like, sector to the green sector?

A: When we look at the market that we are dealing with, when you look at the offshore wind parks that are being built, one of the most important issues is the political. Today, energy from offshore wind parks is more expensive than when you have energy from coal or heavy fuel plants. That means that you have to have subsidies from governments and governments doing strategic planning within the renewable energies. One of the countries that have a prospect of building a huge amount of offshore wind parks is England and their government administration has downturned their investment into these offshore wind parks a bit. So, they have slowed down building the wind parks, and now Germany is maybe the faster mover within offshore wind parks. So, there is no doubt that within renewable energy the political issue is very very important and the politicians, they can kill the market within very short time or they can have the market explode within very short time. If you look at Denmark, we have the next prospect for building offshore wind farm is in Kriegers Flak and that one is also sitting with the Danish government not moving forward, whereas the company, the Danish companies to build the farm, they are ready, they have people ready and the government do not do their part of the deal to make actually things move forward fast enough.
Q: Is it too expensive?
A: It's hmm, but its political issues that when you have to deal with this they have to also allocate funds for this and since it's expensive and it's a political issue that the governments have to fund some of the costs for this. If you look at England, for example the British government, they would rather like to build kindergartens and schools rather than, because they won't have enough money, they say we wait a bit building the offshore parks, because everybody would like to go green but nobody wants to pay. Everybody would like to have green energy, but nobody would like to have a wind turbine in their back yard, so everybody say we don't want a wind park close to our house. So, everybody they are very green, but when it comes down to the money and having the wind turbine in their back yard, then it is suddenly a different issue. So, when you look at this from a political point of view, of course there will be huge discussion on how do you get the funds and where do you get the money from. Do you build a kindergarten or do you built the offshore wind farm?
Q: So, do you think, governments and regulators and policy makers, are they enablers or are they disablers?
A: They are both.
Q: They are both?
A: Yes.
Q: They have played a big role in enabling green?
A: Very big role.
Q: Any specific examples with regard to Semco maybe? How some policies have affected the way your business goes about?
A: For example, our strategic planning was that for one year ago our strategic plan was that the most parts that we were going to build was in the British sector, because their prospect was the biggest in Europe. And our second market was Germany and then our third strategic or

geographical footprint was Denmark, because that is our local market. But, within one year the whole thing changed. England didn't really push through with the prospect, their planned projects. They slowed down on the government funding and actually Germany started to moving faster. So, today it has changed; today Germany's prospects are bigger than England's and that's only from a political point of view. That's only the politicians that has changed this so the politics and governments they play a big role in this.
Q: And that of course changes your day here at Semco.
A: That changes our focus. Suddenly our focus changes from mainly England was our strategic focus, now Germany is our strategic focus. But, then Germany has speed it up a bit, so for us we haven't lost any revenues because Germany has actually been a bit faster than we expected and England slowed down a lot. But then you look at political issues like this, this can speed it up or slow it down within short time. Politicians they don't care whether Semco is sitting and having a budget planning for these parks. If they don't have the money they built a kindergarten instead of a wind farm.
Q: Of course. So what about, for the future, for a more futuristic reference, what can be done from a policy perspective to support innovation, support innovation leading to green and more sustainable developments? What can be done from these parts, the governments, the policy makers? I mean they obviously have a big affect, but what can they do to enable this further?
A: When you look at the offshore wind parks there is different issues. Of course, first of all the education, that they make sure we educate and have plans for our universities to educate new engineers that we need for these projects. We have a lack of people, lack of engineers in Denmark. Our company for example right now we have a lack of maybe 50 engineers to the amount of projects we already have in our company. So government within education and also within innovation and, hvad hedder det. Forskning, hvad hedder det?
Q: Research.
A: Innovation and research on the universities to built test areas, to built test stands, to research on new and better and more effective ways on doing it. That's a very big issue for the governments. Another thing is, for example, when you look at offshore wind parks, it's not only building the wind park, it's also having an infrastructure to actually be able to handle the energy that comes from the wind park to go into the grid system. Building grid highways between the countries so that you can share the energy, when you have too much energy in Denmark when the wind is blowing very much you can maybe send the energy to Germany. So, you build a smart grid that has more, bigger main power lines as a structure. In Europe maybe building a structure that can share energy with the British Isles. Today that is not the case. Today when you have too much energy from the wind parks and you have the coal power plants in Denmark, these coal power plants they cannot go up and down in production. So, when we have too much energy we actually turn down the wind parks where you have the energy, which is green, and almost for free, right? So, then we turn down the wind power and we still continue using the coal. And if you ask the layman about that, that's idiotic! And people will say, what are we doing? But that's actually because of the infrastructure and the whole thing has to be set up more

smart, and build what they call smart grid to be able to use as much green energy as possible and then as little coal energy as possible. And that's very much a new political issue.
Q: Yeah. So that's where the government, in your view, needs to step in and create some alterations?
A: Yeah.
Q: I mean they have in the past cut some taxes. Particularly with the green cars it has been very noticeable and companies like Better Place Denmark have started emerging with electric cars. Do you think something like that, I don't know if it exists within the wind industry or any of the sectors that Semco is working in, but do you get some tax cuts or do you get some benefits from working within the green sector at all?
A: No.
Q: Would that be an idea for future reference, governments supporting greener companies?
A: I don't think they need to support in general our products on what we do or give any tax benefits. But the most important thing is that the government they release the parks and the funding that they need for the companies who actually are the owners and the builders of the parks. Since we are the builder and the engineering company we work for the people who work for the government and of course if the government if they don't support these project, they will stop because otherwise it will be too expensive to have the green energy since the coal created or heavy fuel created energy is cheaper than the wind farms as it is today. And that's why, for example, when you look at innovation and the future, we need to be able to do bigger turbines and more effective ways so that maybe in 10 years or 15 years or 20 years time the price for produced Kilowatt per hour will be maybe competitive compared to fossil fuels.
Q: We've talked a lot about innovation in the very technical sense, meaning product innovation. How about innovation of the business itself, meaning business model innovation? Do you think that will be important for companies in the future that are green and already have a green business concept? Do you think it's important to innovate that? Do you think that will change over time? Do you think it's important to stay up beat or do you think there is a constant forming these companies?
A: I think when you look at green energy it's very new and if you don't have a constant innovation within these companies, constant innovating your way of doing your strategic plan or your business plan you will not be able to survive in this market. You need to constantly be an innovator to be in this market. Otherwise you'll be within few years you'll be doing an old thing because it changes all the time. If you look at what we need to be able to cope with, for example when you look at the turbines, a few years back the height and the amount of megawatt that you would go for. Today the normal for the megawatt for the offshore wind turbines is 2,3 megawatts. It's increasing! So, over a few years maybe it will be the double of the megawatt. So, our way of innovating is also, we don't build a turbine that is Vestas or Siemens or the turbine manufacturers. But then we need to innovate in ways of actually also getting the electricity from the turbines, connecting it, having innovative people to collect that energy and transport it from the park to the shore. And one of the things that we do is to of course transport it from the park to

shore without losing energy or without losing too much energy. That's what you do when you transform the energy. If you just send it will be lost in the line, going maybe 50 or 100 kilometres from offshore until you reach the grid connection.
Q: Yeah.
A: So we need to innovate all the time, constantly, otherwise you'll be left behind.
Q: Ok. I think that is everything for now.
A: Time is up!
Q: Yes.
A: I have to go.
Q: Thank you very much.

Interview 3 – Vice-President of Wind, Oil & Gas; Semco Maritime

A: I am vice-president for wind, oil and gas station, where we have divided the business in two. We have the oil and gas, the traditional simple business, and then we have the new area with renewable, as wind. And Semco started up with renewables in 2002. We did that with a company called Blant Industries in Aalborg, they do the steal work and we do all the engineering and instillation work and the electrical part of it. And since then we have been involved in offshore wind. Our main business is the offshore substations.

Q: Yeah.

A: We turn the power from the wind turbines down on cables onto onshore.

Q: Ok. How would you say Semco Maritime separates itself from other companies that have a similar focus?

A: We have 40 years experience within offshore, on how to behave, how to design and all these things. All these knowledge and experience we have used in our step into the renewables, because then we have gained many many years because then we knew everything in advance so we can start in the very beginning. So, by this we are one of the most established in this area that we are working on right now, in the substations.

Q: Ok. How would you personally define the term business model? What does it mean to you?

A: What we have decided we do all our projects the same way as the oil and gas projects or the renewables projects. All the project management models, how we do the calculations, how we carry out the work is all the same. So, we have the execution of the projects, we don't divide it so it is renewable or is oil and gas project. So, the model is that we have dedicated people on the external, the sales, we have dedicated on the website from promotion of the renewables. But inside in Semco, one day one person can work on a renewables project, the next day he can work on an oil and gas project.

Q: So it is very flexible?

A: Yes, it is very flexible, so the project teams can be used in both areas. Of course we try to specialize some people so they mainly work on renewables or they mainly work on oil and gas because there are still, there is some competences which is more needed in the wind, its electrical knowledge.

Q: Do you think there is a difference between a company that applies a regular business model to a company that has a more green focus and green business model? Do you see a difference between your departments, the oil and gas and the renewables?

A: Not really, not really because we also see that we have respect the environment and also for the oil and gas. So, for us it is just external. Our clients they think, 'ok they have a renewable department', but we don't have any, they just think we have a renewables department. So, if you now go on our webpage you'll see 'ah they have an oil and gas rigs pile projects or they have renewables'.

Q: Yeah.

A: Internal, people we don't say 'I am working renewable'; 'I am working in oil and gas'.

Q: But it's cross-functional?

A: Yes, yes
Q: Ok. How does your business model enhance the green aspects of your business?
A: Yeah, what can I say? Of course it's very good to have renewables, to be involved because we are fighting to get more people into the industry. In this area we can use because its more than up to date when it comes to renewables, not in the oil and gas because we grad there is a little dirty business, because pollution and all these things. So, if we have this renewable and we try to tell a good story, I mean to a way of think greener and also working in the green industry. But we must still have the oil and gas to finance the…
Q: The green side?
A: Yeah, yeah.
Q: So, do you think when it comes to your greening and renewable aspects, how big a role does innovation play? Do you think it's important to be innovative when being green or is it not a necessity?
A: It's important to tell good stories about what we do, I mean the green business, because this gives a modern picture of Semco, it gives a good feeling for the employees and also we need to attract more people and also for our own sake and for everybody's. It's very good to use this as a…
Q: An image?
A: Yeah, an image part of it or it's also not just an image because we are trying to do this and also to have, to develop we have (…) for two and a half years ago, three years ago we didn't have any strategy at all for renewables. It was just the same as one of the others, so it was first three years ago we made the first strategy for renewables.
Q: Ok. Does that differ a lot from the strategy you have for the..?
A: Not a lot, not a lot, but we thought ok we need to have some goals for the renewables, we need to set up targets, how shall we go, and where shall we go, what shall we do? Before we just did what came in through our door. Now we have a plan for expansion also.
Q: So there is a future there?
A: Yeah, new areas and so.
Q: So when looking down the stretch, a five-ten year plan perhaps, is the green part of your company, the renewables part of the company, is that going to take a bigger and bigger role?
A: It will and also I think if you go 2 years ahead I think there will be a renewable division, instead of being part of the oil and gas station.
Q: What effect do you think that will have on the company's strategic outlook?
A: Then it's clear to the people where they are working; it's clear that if they are interested in that they will chose this division. Today it's just a part of one, and also we can put more effort into develop the business also. But I don't think external, I think there will be very very small changes actually.
Q: Yeah.
A: Only we will be bigger, because all the external work we do today is a separate division.

Q: Alright. What do you see as important in order to, or in the future, to implement this green mentality correctly in a renewables department, to think green, to have a more green approach to things? How do you think, how will you tackle this?
A: I don't see any, actually any problem, because it is not so different from all the other businesses we have. So, in my opinion it is, it could have been everything, but it is just a very interesting area because it is growing very much and you need promote yourself if you also have the right attitude and all new things when you are. So, I think it will just have a different focus and customer group. So I don't think it'll be something very very special.
Q: Ok. We'll talk a bit about governments and policies now.
A: Yeah.
Q: What effect do you see them having on the green sector in general..?
A: That's actually one of the dark horses for this, because today offshore wind is subsidised.
Q: Right.
A: And without these subsidies its, nothing would have happened. So, tomorrow the British government could change, 'now we don't want to support the offshore wind, we want to build kindergartens instead of'. Then the business will die overnight.
Q: Right. So they have a big role in this?
A: Yes, very very big role in this. So, what we have to do, as the industry has to be growing up and be profitable by nature and not due to subsidies. But this will last maybe 10 years more before we are there. So, it's still a growing and un-mature business.
Q: And has a direct effect on your business. Is there, because as you said they could switch it off at any point they wish and that will turn the industry around, is that something that affects the way Semco thinks? Are there back-up plans, are there alternatives, or?
A: No, there is no alternatives.
Q: No.
A: That is also one of the reasons we haven't put it out in a division for itself, because if we have only a renewables division and all the business disappeared, then we have to demerge and go back again.
Q: Right, yeah.
A: So, that's also why we are still. But, right now the good thing is there will be some two or three years before we feel the consequences. So we have time to rethink if it happened, because all the projects which are launched they cannot take them back again.
Q: No, I see.
A: So, there will be 2-3 years before we feel..
Q: The consequences.
A: The consequences, yes. And there will still be the operations and the maintenance of what we have already built.
Q: Yeah.
A: So there will be some business, but not as much at all.

Q: Would you say that governments and new policies have altered the way Semco operates over the past ten, fifteen, twenty years?
A: We follow what happens. Right now in Germany they have big problems on the grid collecting and if they don't solve that then all the German projects will be postponed, postponed, postponed. But now they have decided to put more effort so maybe there will be better. So we follow this and that is also why we are not 100% sure what will happen in the future.
Q: What about governments? Do you see them as enablers disablers of this green focus?
A: No, no, they are enablers because they are supporting the law and putting pressure into the industry, pressure onto the power plants and these things, so. If it's just been normal business there wouldn't have been any offshore wind parks.
Q: I see. So governments are forcing it in a way?
A: Yes!
Q: Definitely. What about in the future, are there any things you can see from a policy perspective that would benefit, not only Semco, but the green industry in general? I don't know, some tax cuts perhaps or some alterations that will enable growth?
A: Yeah. The benefits actually now is not tax cuts. Today there is obligations, they have clear obligations what to do. They have to buy, you and I we have to buy a certain percent green energy. So it's all the obligations, that they have to fulfil these obligations the power plants. That's why the need to invest in these offshore wind parks. So today it's more the pistol than the carrot.
Q: Right. Well how do you see the future of the green industry in general? What does that depend on? Does it come down to companies like Semco developing new innovative products that will make things cheaper..?
A: It will be, because if we are not in the long run, we'll be competitors to coal or something else and I think the industry will slow down again.
Q: But it is an incentive to have the coal as well, isn't it, next to the…?
A: Yes, but it still has to be competitive to compare, because if coal are half price then it's pure competition, then nobody want to buy the green energy.
Q: Yes, of course.
A: So there need to be a price reduction. But what I see, I think the other way oil will rise so much in price so we don't need to cut the cost in renewables, because in the other energy the price will also go up.
Q: So, still on the prospect of the future, you say that the green sector remains as it is…
A: Yes, because the demand will just go up and this demand can't be fulfilled with fossil.
Q: By itself?
A: No. So there need to be other sources.
Q: Do you think that will have an effect on, do you think it comes down just to technological innovations or do you think it'll have an effect on companies and the way their business models works, like green business models? Do you think there will be an innovation in that sector as well?

A: I think all working in renewables they constantly think ‘how can we make things more efficient’? And this together shall bring down the price and combined with the oil prices going up I think it’ll, I don’t know, hard to say when it’ll break even, but in the next 10 years it will break even.
Q: That’s all.
A: Yeah.
Q: Thank you very much.
A: You’re welcome.

Interview 4 – Renewable Energy Project Manager; Prospect Law Ltd

The following interview was conducted, and the subsequent answers were received, over email exchanges in December 2012.

Q: *What is your position at Prospect Law and what does it entail? How long have you been involved with the organisation?*
A: I am a Paralegal at Prospect Law (PLL) and also a Renewable Energy Project Manager for Prospect Energy (PEL). After obtaining a business degree I completed the law conversion and the Bar finals, before working in the renewables industry for 2.5 years and then finally coming to PEL and PLL in June 2012. Having worked in the industry for 2 years and for 6 months at the regulator (OFGEM) I help bridge the gap between the legal practice and the energy consultancy, making sure our legal work reflects the technical requirements of the industry to make sure we are *the* 1st choice law firm for energy projects.

Q: *How does Prospect Law separate itself from other legal disciplinary practices? What are the values, mission and goals of the firm?*
A: By being a legal disciplinary practice (LDP) PLL is already different from the vast majority of the UK legal services market. Whilst the majority of the industry is still structured along the solicitor/barrister divide by being an LDP we can have both functions in-house. What makes PLL truly unique is the combination of a law firm and a sister energy consultancy – as far as I am aware we are the only one. This search for synergy allows our energy project work to be informed by current best legal and policy knowledge whilst our legal work is informed by strong commercial reality and technical clarity. It is this company sisterhood that allows us to sit on both the technical AND the legal panel for lenders looking to fund large-scale renewable projects.
Regarding values, mission and goals… this is a difficult question as there is not as of yet any official. As a young practice

Q: *What is the difference, from a business point of view, between a firm with a green/sustainable focus in comparison to one without one?*
A: Depending on the industry this is very variable. Taking general business offices as an example (such as a corporate HQ) green/sustainable practices can put costs up (e.g. only buying recycled paper or from guaranteed sustainable sources) but can also save money (implementing a selective printing policy – saving paper, toner and printer wear). The real benefit, in my view, by adopting a green/sustainable focus is felt in the areas of HR (staff morale, staff recruitment, staff retention – more people want to work for companies with a 'good guy' image), PR (having a 'good guy' image sells…) and also (and, in my view, most importantly) in change management – a company always looking at itself for ways of improving its sustainability and green credentials is more likely to also strive towards other improvements and, as such, be more open to change – which is a serious source of competitive advantage. IBM got stuck in their ways and so Dell came in and stole their market by embracing new ways of doing business.

It is certainly possible that there are market niches for 'green' businesses that will yield, at least at the head of the curve, supernormal profits. Just as The Body Shop built a brand (and a fortune!) around being ethical traders and not testing on animals, companies such as Ecotricity (a big energy supplier in the UK) have built competitive advantage on a green/sustainable agenda.

Q: *Do their business models and/or operations vary? If so, how?*
A: Not as much as I think many people would suspect – although they will to some degree. As above business models will likely be adapted to benefit as much as possible from sustainability but the underlying model in most cases will be easily recognisable. Operations may vary to cut down on harmful feed-stocks (i.e. supply-chain greening) and processes but this always finds itself in a wider cost/benefit analysis exercise. As examples supply-chains may start to include a higher proportion of recycled (or recyclable) materials or, on a more service industry level instead of staff from distant offices travelling to meeting they may utilise video-conferencing to save on CO2 emissions from cars/flights (you will notice this also saves the cost of staff time and the financial cost of this transport – so being green dues not necessarily mean an increase in costs).

Q: *Does innovation play a role for green/sustainable firms? If so, how and how big a role does it play? Examples perhaps?*
A: Innovation is, in my view, the biggest reason that new businesses successfully enter the market. I think there is a split between older firms that are 'greening up' by changing their working practices and newer firms that are entering the market on the basis of innovative sustainable business models. It is hard to say exactly how big a role innovation plays as it can be from very little to very large – from a food manufacturer reducing the levels of packaging to reduce waste through to, for example, bus manufacturer gaining market share by producing greener 'hybrid' buses with new engine technology.
ISO14001 accreditation is increasing in popularity and is perhaps now the de facto international environmental standard.

Q: *Do policies/regulations/governments etc. have an effect on the way green/sustainable oriented firms conduct their business? If so, what is the effect and how does this occur? Could you provide some examples?*
A: Almost certainly – and I dare say that is their aim. There are UK systems such as the Climate Change Levy in which companies are taxed for energy usage – leading to greener practices and greater efficiency, European initiative such as WEEE regulations 2006 (the UK implementation of Directive 2002/96/EC – since amended) leading to recycling of electronics and a number of similar schemes.
From a slightly different angle there are also businesses that are set up in order to service markets created by government policies/regulations – such as companies that serve the renewable energy markets in the UK and Germany (who both have Government-sponsored feed-in tariffs).

Q: *What effect do emerging green policies/regulations/legislations etc. have on Prospect Law and your clients? Could you provide some examples?*
A: We act for many clients who operate in the commercial property, environment & planning and energy sectors – all of which are key targets for Government policy or legislation around sustainability. The main effect is that we have to remain on top of the constant development in these areas, such as the changes to the Renewables Obligation Order (as amended) and the new Energy Bill that is news in the UK at the moment, so that we can fully advise.

Q: *What can be done in the future, in your view, to further support green/sustainable firms from a policy perspective and how noticeable are the changes made already? How do you think this will this affect the business world?*
A: Certainly in the UK we have the concept of a 'sin tax' – anything that is bad for society is taxed to drive up the costs to drive down demand. Alcohol and tobacco taxes are the traditional example. It seems that things that are environmentally harmful are also being treated in such a manner, with the Climate Change Levy on energy, high duty on Petrol and Diesel, high road tax on polluting vehicles and the various "carbon credit" systems that are being introduced. Whilst the free market may not value environmentally sound practices (as they sometimes drive up costs) by adding selective taxes and rebates governments can 'correct' the market. The best thing that governments can do to assist companies that adopt sustainable practices is to make sure that they do not lose their competitiveness due to following a green/sustainable agenda. If the playing field is level this allows firms to make the choice to act in a sustainable manner without losing out, whereas if they are able to utilise Government policy to gain competitive advantage this will drive forward such behaviour and establish it as the norm. There are some examples already - e.g. energy produces that use renewable sources would not be able to compete on electricity export price alone – as it is more expensive to produce than gas or coal – however through the Renewables Obligation these generators are issued 'certificates' for the energy they produce and these certificates are given a market value by legislation that forces electricity supply companies to buy a quantity of these each year. This way the combined sale value of the generated electricity and the 'certificates' allow these generators to compete.