The Battle in the Wind Energy Industry

The Case of Envision Energy

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Abstract

Wind power is one of the world fastest growing electricity sources in the world and has since 1990 roughly been doubling in capacity every four years. The industry boom and the followed technology development has made the clean and inexhaustible wind energy, price competitive with fossil fuels, making wind power a sustainable tool to address climate change. The European and the North American market was long the dominant wind power markets in the world. Due to the rapid development in emerging economies a change in both market and turbine manufactures has occurred, making Asia the largest market in the world, housing five of the top ten wind power manufactures in 2015.

This thesis focus on business model research in Envision Energy, a Chinese wind turbine manufacture, which in short time has gone from being a new entrant to one of the top manufactures in the world, focusing on quality and technology innovation. The research combines primary data from a semi structured interview with secondary data about Envision, the wind industry and the Chinese wind industry. By exploring Envisions business model and the context they operate in, this study found some key factors for Envision successful business model and drivers to enter the international market.

As a Chinese wind turbine manufacture, Envisions have done many things that stands out compared to their domestic competitors. Already in their initial stage they set out to establish international innovation centers to be present in the global technology hot spots and be up to date with the newest technology and solutions. Their global presence was made possible by requiting industry experts from competitors, which also came to Envision with the necessary technical know-how, market knowledge and industry networks. Focusing on technical innovation and emphasizing on quality, Envisions has developed new innovative turbine and software solutions, using globally recognized suppliers instead of the domestic suppliers mostly used by their Chinese competitors. Envision has become recognized as quality wind turbine provider in the Chinese market who takes system integrated life cycle approach to lower the cost of energy. With their vision of revolutionize the energy sector on a global scale, Envision recently entered the international space on three continents, with a generic internationalization strategy.

The human resources are the core of Envisions business model and are the underlying factor of their rapid success in the Chinese market as they managed to provide reliable turbines when their competitors struggled. With the human resources Envision could establish themselves internationally short after their foundation. The combined knowledge from the international organization enabled them to develop innovative wind turbine solutions, while emphasizing on quality. With a system integrated life cycle approach Envision focus to lower the cost energy with wind turbine solutions and a software system which can enhance asset life and performance on any renewable energy asset. The vision to make an impact on the energy sector has been the main driver behind Envisions internationalization, even though external drivers are imminent.

Keywords: Wind Energy, Business Model, Business Model Innovation
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1. Introduction

Envision Energy is an emerging energy solution provider which entered the wind power market in 2007 and became the 3rd biggest turbine manufacture in China, and the 9th largest in the world in 2015. Envision makes an interesting case to study due to their rapid development as a new entrant from an emerging economy, empathizing on quality and becoming a driving force in the knowledge intensive wind energy industry. With technical innovation and revolutionizing solutions for a more sustainable energy further, they now stand to start a new chapter in their history as they have initiated an internationalization process.

1.1 Background

Wind is a clean, abundant and inexhaustible energy resource that has been harnessed for many centuries. Back in time, windmills were used to grind grain and manufacturing goods by converting the wind to mechanical energy. Later on, windmills were redesigned to generate electricity, now known as wind turbines. It is the heat of the sun that creates the horizontal motion of air across earth’s surface. The solar radiation creates differences in air pressure between two regions when the surface is up heated in various pace. One phenomenal that is vastly known is onshore and offshore wind. Since land masses warm more rapidly than water, a lower air pressure is created over land. As the warm air rises over land, cooler, high pressure air from the sea moves in to fill the void, resulting in a steady breeze known as onshore wind. The land mass also cools off faster than the water, resulting in a reversed air pressure and generating an offshore wind when the sun goes down (Chiras, 2010).

As many other renewable energy sources, wind as an energy source got increased attention during the oil crises in the 1970’s which fueled the wind turbine development. The modern history of wind power starts with 7 MW and 18 MW cumulative installed capacity in Denmark and US in 1981 (Global Wind Energy Concil, 2015). In the early days of the industry, the price from wind energy had difficulties to compete with the much lower priced energy from fossil fuels. But with different incentives the market grew and the technology was pushed forward. Now, wind energy is leading the transition away from fossil fuels into a more sustainable energy supply (Global Wind Energy Council, 2015).

Wind power has become the least-cost option for new power generating capacity in an increasing number of markets. Meaning that: Wind is an option for providing reliable electric services to electric customers which will, minimize the life-cycle-system costs, including adverse environmental effects, of providing such services (Renewable Energy Policy Network for the 21st Century, 2015). It is in the past few years, the capital costs of wind power have declined, due to increased competition as well as through technological advances that has increased the capacity factors (IEA, 2015).

In the wind power industry there is two different markets, onshore and offshore. Onshore wind power technology is the most mature, and are now cost competitive on a kWh basis with new coal or gas fired plants, even without governmental support systems. Offshore technology however, still has challenges in reducing cost for their different technology and logistical issues. Most of the bottle necks has been overcome, but their still is challenges ahead. The current price range for offshore wind is $168-204/MWh. In 2015, Vestas, Siemens and Dong Energy signed a joint declaration to reach a united industry goal to drive the cost of offshore wind energy below $122/MWh by 2020. This can be compared to today’s onshore price range of $85-110/MWh (Renewable Energy Policy Network for the 21st Century, 2015).
The wind power technology has come a long way, at first wind turbines generated KW and now they can generate 3.5-10MW depending on onshore or offshore technology (Power-technology, 2014). Europe, US and Asia are the leading contents in the development of wind power technology and are the main drivers for the wind energy production, increasing from 13,600MW in 1999 to 432,419 MW by 2015 (Pataci, Danilovic, Liu, Hoveskog & Halila, 2015; Global Wind Energy Council, 2015). The 5-year average annual growth rate in the industry is 7%, indicating a strong market with heavy competition among actors (Pataci, et al., 2015; Navigant Research, 2015).

In this booming period, the global dynamics of the wind power industry is changing. Despite the rapid growth in terms of installed capacity, the seven most established wind power manufactures are losing market shares to new entrants that mostly has been formed in emerging economies (Pataci, et al., 2015). With strong economic growth and new great energy demand, emerging economies have become a strong market force for wind power manufactures with both domestic and international competitors (Climatescope, 2015). With the increased competition, companies now need to rethink and innovate their business models in order to compete in the rapidly changing environment (Campell, Danilovic, Halila & Hoveskog, 2014).

1.2 Problem discussion
To understand the dynamics of the wind power industry this thesis will explore how Envision as a new entrant is working with their business models to create a competitive advantage. From figure 1 it is clear that the western wind power companies as Vestas, Enercon, GE Energy and Gamesa has lost substantial market shares to competitors represented under “Others”, which host all operational wind energy companies not mentioned in the graph by name. The graph raise questions as why and how is this happening, and at such rapid speed? The thesis therefore will address these as contextual factors when studying the chosen case company.
Due to the fears competition wind turbine manufactures as Nordic Windpower, WinWinD has left the industry. Those who still is operational has been reshaping their business models, value proposition and value creation in order sustain their competitive advantage (Pataci, et al., 2015). The rapid development in emerging economies as Africa, has shown that there is a difference between “Developed-country Multinational Enterprises (DMNE)” and “Emerging-country Multinational Enterprises (EMNEs)”, in the way companies approach business model innovation (Campell, et al., 2013).

In modern time, the concept of business model and business model innovation have grown in popularity (Osterwalder & Pigneur, 2009). A business model contains various components, what particular components depend on what type of business model is adopted (Zott, Amit & Massa, 2011). Business models are a way to explain how an enterprises work. It describe who the customer is and what the customer values are, and what the value proposition are for the enterprise (Magretta, 2002). When components of a business model are changed, altering the way a company is creating, delivering and capturing value, it is refereed to as business model innovation (Klang, Wallnöfer, & Hacklin, 2014). Business model innovation can help an organization to gain a competitive advantage by including the entire enterprises way of conducting business and not just changes in product and processes. Since the market constantly change, companies should strive to actively search and consider improvements to their business models (Teece, 2010).

Business model innovation will become an important tool for companies in the renewable energy sector when the global awareness is increasing of renewable energy and energy efficiency as a critical factor to address the climate change. During United Nations (U.N.) Climate Change Conference in Paris COP 21 (Conference of parties) in late 2015, more than 150 presidents and prime ministers gathered to reach an agreement on how the environmental issues from emission from fossil fuels should be addressed. A breakthrough was meet, for the first time in history, all parties agreed upon to regularly report on their emissions and implementation efforts, and undergo international review. Other landmark agreements were reached. Among them the reaffirm of the goal to limiting global temperature increase well bellow 2 degrees Celsius, while urging efforts to limit the increase to 1.5 degrees. In general COP 21 was an success, and as the French President François Hollande summed it up (Center for Climate and Energy Solutions, 2015):

“In Paris, there have been many revolutions over the centuries. Today it is the most beautiful and the most peaceful revolution that has just been accomplished – a revolution for climate change.” – François Hollande

United political forces have the power to make a change on global scale through emission and energy policy tools, putting pressure on the industry and energy sector to innovate and compete with more efficient technology and procedures. This thesis will concentrate on the wind power industry and the battles fought for future survival in the competitive industry. Wind power companies today compete with more than just innovative wind turbine solutions, it is also about maintaining and prolonging the turbine life trough service and maintenance, as well as optimizing the power output from the wind assets trough monitoring and control systems.

The main challengers for wind turbine manufacture coming from China is the lack of reputation and global experience. They are also behind in terms of proven safety, quality,
reliability and after sales services. Developers in the international space therefore might have concerns about the turbine performance, warranties, services and recourses if something goes wrong. The unflattering history of high numbers of grid failures, breakdowns and equipment failures from Chinese turbine manufactures has also contributed to confirm the already existing hypotheses of China as a low quality provider, which companies who wish to enter the international space have to overcome (Zhang, 2012).

In an attempt to take the technology development forward, the Chinese government and the China Development Bank offers finical aid to those manufactures how expand internationally, another finical advantage is the lower wind turbine price, which is usually 20-30% less than the western manufactures (Zhang, 2012).

1.3 Research Purpose
Global, large wind turbine manufactures have lost substantial parts of their market shares, in the same time as Envision has managed to go from new entrant to becoming one of the largest wind turbine manufactures in the world without doing a great deal of international business. As a fast growing Chinese turbine manufacture, focusing on technology innovation with a recently initiated internationalization process, Envision make an interesting case, which this thesis will be based upon. A single case study will be conducted with a business model innovation approach exploring the underlying factors of Envision successful business model and what drives them to enter the international space.

The purpose of my research is to seek and explore how Envision has managed to become one of the top wind turbine manufactures in the world, capable to compete with the more established enterprises in the industry at such short time, and how they will continue to do so by answering the research questions:

- What is the underlying factors to Envisions successful business models?
- What are the drivers for their internationalization?

This study, aim to give insights in how a new entrant, coming from an emerging economy has built an organization in a protective market and managed to develop a business model ready to compete internationally.

The result of this study is of interest to the industry, governments and researches to further understand the new dynamics of the industry and the impact of competing with business model innovation.
2. Framework of references

2.1 Business Model

The wind power market used to be dominated by western wind turbine manufactures as Vestas, Siemens and others. With increasing energy demand and new market opportunities the competition in the wind market has increased and put more pressure on manufacturers to have a well thought out business model that strengthen their position in the market place. The business model concept is often used by journalist, business people, consultants and academics, despite the attention, the understanding of concept is relatively new (Osterwalder, Pigneur & Tucci, 2005; Linder & Cantrell, 2000). Further the buzzword of business model and business model innovation has been misinterpreted, misused and frequently been confused with popular management terms as strategy (DaSilva & Trkman, 2014). According to (Osterwalder, et al., 2005) the origin of the term “business model” can be traced back to 1950’s but was not adapted by the broad audience until 1990 together with the internet era. In between that period, is was technology firms as Dell, Xerox and Intel that lead the development and innovation of business models forward (Gibson & Jetter, 2014). Confusion about what business models are, steams from different authors approach to the term, such as parts of a business model, types of business models, concrete real world instances of business models or concepts (Osterwalder, et al., 2005). Updated research in the area have led to more united front and define a business model as:

“A system that solves the problem of identifying who is (or are) the customer(s), engaging with their needs, delivering satisfaction and monetizing the value” (Baden-Fuller & Haefliger, 2013, p. 419).

A business model describe the design or architecture of an organizations way to create and deliver value to their customer and convert payment for that delivered value to profit (Teece, 2010). A business model is a reflection of a firms realized strategy and can be clarified by the definitions:

“Business model refers to the logic of the firm, the way it operates and how it creates value for its stakeholders” and “Strategy refers to the choice of business model through which the firm will compete in the marketplace (Casadesus-Masanell & Ricart, 2010, p. 196).

The presented definitions are closely related (Osterwalder, et al., 2005 p. 10) definition from 2005:

“A business model is a conceptual tool that contains a set of elements and their relationship 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 and relationship capital, to generate profitable and sustainable revenue streams”.

The resemblance was found in an academic literature review of business model definitions between 1975 and 2009 by (Zott, et al., 2011) which aimed to provide researchers with the most up to date literature review (see table 1).
Table 1. Summary of business model definitions selected by (Zott, et al., 2011 p. 1024).

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Amit &amp; Zott (2001, p. 511): Zott &amp; Amit (2010, p. 216)</td>
<td>“The content, structure and governance of transactions designed so as to create value through the exploitation of business opportunities […] a system of interdependent activities that transcends the focal firm and spans its boundaries”</td>
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<tr>
<td>Chesbrough &amp; Rosenbloom (2002, p. 529)</td>
<td>“The heuristic logic that connects technical potential with the realization of economic value”</td>
</tr>
<tr>
<td>Magretta (2002, p. 4)</td>
<td>“Stories that can explain how enterprises work. A good business model answers Peter Drucker’s age-old questions: 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?”</td>
</tr>
<tr>
<td>Morris et al. (2005, p. 727)</td>
<td>“Concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets”</td>
</tr>
<tr>
<td>Johnson, Christensen &amp; Kagermann (2008, p. 52)</td>
<td>“Consist of four interlocking elements that, taken together, create and deliver value”</td>
</tr>
<tr>
<td>Casadesus-Masanell &amp; Ricart (2010, p. 195)</td>
<td>“A business model is … a reflection of the firm’s key resources, and key processes”</td>
</tr>
<tr>
<td>Teece (2010, p. 179)</td>
<td>“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 the value”</td>
</tr>
</tbody>
</table>

Timmers, 1998 and Casadesus-Masanell & Ricart, 2010 choose to focus on enterprises internal and external operation when defining a business model while other focus more on the interdependent activities that enables enterprises to create and deliver value to the customer while generating profit. The goal with a business model is to create value that customers want to pay for and which the enterprise can make a profit from, and the profit lies in how the enterprise handles their internal and external activities. The interdependence between the elements is key to the outcome of a business model, thus a business model should describe the logic of the holistic system of enables a enterprise to make a profit.

Even though (Osterwalder, et al., 2005) definition seemed to be a reference point (Zott, et al., 2011) saw a pattern of “young and quite dispersed” patterns of definitions emerging in table 1. A more accessible definition from (Osterwalder & Pigneur, p. 14, 2009) was presented in 2009:

“A business model describes the rationale of how an organization creates, delivers and captures value”.

Given the clear definition by (Osterwalder & Pigneur, 2009) and the fact they presented the business model canvas, which is a analytic tool together with the definition, this thesis will
adopt the definition and the model when analyze the findings of the the case company, as this thesis literature review sums up the concept of a business model as:

*A holistic interdependent system that describe how an enterprise will create and deliver value to their customers while generating profit with internal and external operations.*

Osterwalder & Pigneur, 2009 definition is similar and work as foundation for the own interpretation of the business model concept throughout the thesis.
2.2 Business Model Innovation

Schumpeter (1934) Stated that there are five kinds of innovations: (1) new products, (2) new methods of production, (3) new sources of supply, (4) exploitation of new markets, and (5) new ways to organize business. Product and process innovation no longer offer the sustainable competitive advantage it once did, due to the rapid technology imitation of competitors (McGrath, 2011). New information and communication technologies has revealed new tools to compete with, enabling companies to rearrange their value creation activities in more effective manner (Matzler, Bailom, Friedrich von den Eichen & Kohler, 2013).

“Companies often make substantial efforts in innovating their products and process to achieve revenue growth and to maintain or improve profit margins”- (Amit & Zott, 2012, p. 2)

The product and process innovation is time-consuming and expensive, many organizations therefore try to actively adopt business model innovation but in reality few know what they are actually doing (Osterwalder, et al., 2005; Amit & Zott, 2012).

Every organization has it own unique starting point when it comes to design or redesign a business model which also comes with unique challenges, obstacles and critical factors for success (Osterwalder & Pigneur, 2010). The need to change a business model can arise from external and internal factors such as competitive environment, economic climate and industry transformation or modified revenue models, new product and service offerings (Grissen, Riddleberger, Christner, & Bell, 2010). This is supported by (Lambert & Davidson, 2013) which state that when internal changes in an organization occur, it may cause a need for change in the business model as well. It is also crucial to have he ability to adapt to changes in the external environment which can present opportunities and potential to improve the performance of a company (Lambert & Davidson, 2013). Established organization may need to renew their business model due to new competition in their segment in order to capture sufficient value for themselves (Sosna, Trevinyo-Rodriguez & Velamuri 2010). It is preferred if the organization itself is able to initiate the changes in the business model and not being forced to do so as a response to external factors (Teece, 2010). Even a successful business model have a short lifespan and should be updated continuously in today’s business climate (Osterwalder & Pigneur, 2010). Thus, there is no optimal business model design, due to the complexity of organization structure, the business model innovation process should therefore be open to follow the evolution as an ongoing effort (Cavalcante, 2014).

Business model innovation has been receiving increased attention by corporate practice and academic literature in recent years in order to adapt to the rapid changing business environment (Speith, Schneckenberg & Ricart, 2014; Casadesus-Masanell & Zhu, 2013; Gibson & Jetter, 2014). The research on business model innovation is concentrating on changes in the business model and its components, and the search for new logics within the existing organization to capture and create value for customers, suppliers and partners (Lambert & Davidson, 2013; Casadesus-Masanell & Zhu, 2013). Little is know about the drivers that triggers and initiates business model innovation and further research is being encouraged (Waldner, Poetz, Grimpe & Eurich, 2015).

Chesbrough (2010) agues that business model innovation often tends to increase when the current business model shows signs of weakness with dropping revenue. Another pattern was found by (Waldner, et al., 2015) which state, ”we find most business model innovation to occur in the emegent life cycle stage”, which suggests that firms are experimenting with different configurations of their business model until it becomes stable and is exploited over time (p. 24-25). A companies life cycle can be divided into five phases: (1) Birth (2) Growth
(3) Maturity (4) Revival, and (5) Decline (Miller & Friesen, 1983, 1984) which means that (Waldner, et al., 2015) are referring to phase (1) and (2). Taking a different approach (Grisen, et al., 2010) found that business models for successful business model innovation are: (1) Well aligned both internally and externally, (2) Based on and continually monitored through sophisticated analytics, and (3) designed to be adaptable.

Osterwalder & Pigneur (2010) address the business model innovation process as result from one of following four objectives: (1) to satisfy existing but unanswered market needs (2) to bring new technologies, products or services to market, (3) to improve, disrupt, or transform an existing market with a better business model or (4) to create an entirely new market. An additional four motivational factors are presented as: (1) a crisis with the existing business model (in some cases a "near death" experience), (2) adjusting, improving or defending the existing model to adapt to a changing environment, (3) bringing new technologies, products or services to market, or (4) preparing for the future by exploring and testing completely new business model that might eventually replace existing ones.

According to (Gibson & Jetter, 2014) there are many pitfalls such as unforeseen costs and risks that comes with business model innovation. Beside the cost and uncertainty there is challenges and difficulties in testing the model before launching it in full-scale and to continuously adapt the business model to the changing market (Osterwalder & Pigneur, 2010). Chesbrough (2010) highlights that even though tools and models might be helpful, they are not enough, since organizational processes must be changed as well. It is a challenge to incorporate such a process that insure an appetite for new business models in a changing environment and in the same time focus on long-term business (Osterwalder & Pigneur, 2010). Especially since it does not exist an instrument which can guide the analytical work of changing a business model (Cavalcante, 2014).

The business model innovation process in an organization is usually in the hands of top management (Leih, Linden & Teece, 2015) The efforts of top management can be compromised if the rest of the organization is not able or willing to implement and perform a new business model. Implement failures can reflect short comings in the leadership or lack of communication which leads to a lack of knowledge and understanding for the underlying reasons for a organizational change (Leih, et al., 2015). Chesbrough (2010) argues that an open business climate within the organization is needed to effectively be able to implementing business model innovation. Some of the companies that has been successful in their adoption of business model innovation processes are Apple, Tesla and Amazon. Several other companies owe their success to the business model concept and studies are piling up, showing that business model changes are among the most sustainable forms of innovation (Sosna, et al., 2010). It is a process in which companies deliberately change the core elements in their way to conduct business (Bucherer, Eisert & Gassmann, 2012).
2.3 The Business Model Canvas

The business model concept is some abstract and is hard to visualize without using models as it puts the focus on a system level. Campell, et al. (2014, p. 6) describe a business model consisting of four elements: value proposition, value creation system, value deliverance and value capture, which is suitable for comparison of several companies business models (Pataci, et al., 2015). The value proposition need to be clear and specify how the an enterprise offer value to their customers. The value creation describe the sources that enables the enterprise to offer its customers added-value through resources (e.g. financial, physical, human, technological, organizational), and are created on every step of the value chain, for example networking, interlinked activities, alliances with different actors, integration timing and sharing. The value deliverance state market orientation, customer relationship and distribution channels in which an enterprise transfer its products and services to the market. Value capturing activities refers to the way an enterprise is generating revenue through sales and managing the cost structure of its operations (Campell, et al., 2014).

Hedman & Kalling (2003) empahsize a six element model: customers, competitors, offering, activities and organization, resources, and supply factor and production inputs. Osterwalder & Pigneur, (2009) present a more comprehensive model, listing nine building blocks: customer segments, value proposition, channels, customer relations, revenue streams, key resources, key activities, key partnership and cost structure. In many ways the three models bring up the same factors for analysis, even though Campbell et al, 2014 model chose to embed the factors in their four elements.

The three different models have different strength and weaknesses but they all somehow simplifies the concept of a business model. A model can be seen as a tool that helps visualize and capture a company’s business model, making it easier to analyze, track or suggest changes. One widely adopted model from 2004 is the Business Model Canvas, which with it nine building blocks allows an extensive analysis of one firm, like this single case firm (Osterwalder & Pigneur, 2009). The model removes much of the abstract complexity in business models and are therefore useful when communicating to stakeholders, such as suppliers or partners, by giving them an opportunity to visualize and identify problem areas in the business model (Gibson & Jetter, 2014). It is important to understand each one of the nine blocks in order to understand their individual function and how they are linked together as whole (Osterwalder & Pigneur, 2009).

After evaluating existing models, this single case study, aiming to explore Envision business model and the underlying factors of their success, will use the business model canvas in order to capture a more comprehensive illustration of their business model. The reason is that, without knowing where to search for the factors that has made Envision successful, the higher numbers of building blocks will expand the search and enable a deeper analysis which can lead to more explicate findings.

Researcher as (Euchner & Ganguly, 2014) argue that the business model canvas can be useful when illustrating a business model, but that it does not revel the “key dynamic elements of working business models” (p. 35). Similar concerns are raised by (Gibson & Jetter, 2014) that argue the problematic of the business model canvas being static and difficult to document changes in, over time. Despite the flaws, (Gibson & Jetter, 2014) are of the opinion that the business model canvas currently is the best model to modify and describe the evolution of business model in a business model innovation approach.
1. Customer Segments
In business, it is important for companies to know who their (profitable) customers are and what needs they have. Without these most important customers, there is no future for the company. A company may have different products, targeting different customer segments, important is that the organization understand what segment to prioritize and which to ignore. When that decision has been taken, a customized business model can be designed to serve and create value for that segment(s), concentrating on their needs (Osterwalder & Pigneur, 2009).

2. Value Propositions
The Value propositions describes how a company work to satisfy customer needs with their products and services, in order to create value for a specific customer segment. The ability to solve customer problems and satisfy their need are the reasons customers turn to one company over another. Customers can have different needs, new products, increased performance, customization etc. the important thing is to be able to provide what they want and need (Osterwalder & Pigneur, 2009).

3. Channels
This part of the model describe how the organization communicate, distribute and reaches their customers. Through which channels do the customer want to do business? Can the organization improve the channels to better raise awareness of our company’s products and services and allowing the customers to evaluate and purchase them? How does the organization deliver a value proposition and take care of after sales and customer support? (Osterwalder & Pigneur, 2009)
4. Customer Relationships
This building block explains the relationship an organization has established with each customer segment the companies conduct business with. Different customer segments require different relationships for a successful business relation and can be driven by acquisition, retention or boosting sales (Osterwalder & Pigneur, 2009).

5. Revenue Streams
There are several ways to generate revenue streams, which describes how the organization is generating money from each customer segment. The key questions for an organization is to find out what value their customer currently paying and what kind of value they are willing to pay. Pricing can vary between different revenue streams, such as bargaining, market dependent, bulk or fixed list prices. Different business models use different payment methods to fit their own and customer needs. Example direct, one-time, ongoing or credit payments (Osterwalder & Pigneur, 2009).

6. Key Resources
Every firm’s business model and value propositions relies on key resources in order to create and offer some kind of value. The key resources can be divided into: physical assets (facilities, machines, distribution network etc.), intellectual resources (proprietary knowledge, patents, copyrights etc.), human and financial resources. Different key resources are needed depending on business model and can be in-house, leased or acquired from others (Osterwalder & Pigneur, 2009).

7. Key Activities
The key activities describe the most important things a company must muster in order to make the business model work. The key activities are required, as the key resources, to create and offer a value proposition and earn revenues. The activities can be mentioned as production, problem solving, platform or network (Osterwalder & Pigneur, 2009).

8. Key Partnerships
Companies forge partnerships for many reasons and are used as a tool for a firm’s business model. The key partnership building block in the business model canvas describe the network of suppliers and partners that make the business model work. By alliances firms reduces their own risk and in the same time stand better equipped to compete on the market. There are three main motives for partnership: economy of scale and optimization, reduction of uncertainty and risk, and acquisition of particular activities and resources (Osterwalder & Pigneur, 2009).

9. Cost Structure
This building block describes the the most important cost incurred while operating under a particular business model. There are two broad cost structures, value-driven and cost-driven, most firms use a mix of both. This building block helps firms to track down cost in their activities and use of resources, allow them to streamline the organization (Osterwalder & Pigneur, 2009).

The business model canvas captures the rational of how a company creates, delivers and captures value, and are believed to give insights in Envisions business model. Further the model has a clear structure, making it easy to use and adopt on company of which little is known.
2.4 Internationalization

Technology have increased the global communication and transportation, making the international business space more accessible. In the process internationalization has become an essential component of corporate strategy (Koch & Meckl, 2014). Research suggests that firms usually move into the international space step by step as they gradually gain experience and knowledge about foreign markets (Ying, Ming & Hsieh, 2013). The gradual internationalization strategy was conceptualized by (Johansson & Vahlne, 1977) in their Uppsala internationalization model. The global space now moves more rapidly with increased competition which has accelerated the process. Accelerated internationalization is an important phenomenon in international business, which is linked to studies of born globals, which is defined as “business organizations that from inception, seek to derive significant competitive advantages from the use of resources and the sale of outputs in multiple countries” (Oviatt & McDougall, 1994, p. 49). The term “accelerated internationalization” is defined as “the phenomenon of firms engaging in the international business activities earlier in their organizational life cycle than they have historically” by (Shrader, Oviatt & McDougall, 2000, p. 1227). While another approach is given by (Tan & Mathews, 2014, p. 419) which argues that a more appropriate defining characteristic of accelerated internationalization should be “the change of rapidity of firm internationalization at a given time or over a certain period of time, rather than the earliness of internationalization”. Tan & Mathews (2014) base their statement on that acceleration is defined as the rate at which the velocity of a body changes with time, and therefore the term accelerated internationalization should focus on the change of pace or speed of internationalization. The defining characteristics of a born global and accelerated internationalization are linked together accordingly and can be hard to separate. By leverage a global supply chain using global suppliers- and human resources in an initial stage of the company, they can be considered born global. When the company later is seeking new international markets in a rapid expansion for their products and services they conduct an accelerated internationalization (Weerawardena, Mort, Liesch & Knight, 2007).

The rapid Chinese wind turbine development have increased domestic competition and in recent years, an increasing number of firms have been entering the international space in search for of new markets (Zhang, Wang, Wang & Zhao, 2015). According to (Bonagli, Goldstein & Mathews, 2007) a common success factor for emerging markets multinationals enterprises (EM-MNEs) is there ability to treat global competition as an opportunity to build capabilities and adopt strategies that turn latecomer status into a source of competitive advantage. With good timing and rapidness EM-MNEs can leverage various kinds of strategic and organizational innovations in order to compete on markets already populated by world-class competitors (Mathews, 2002). When Chinese wind turbine manufactures step outside the domestic market they mainly have three export modes. (1) Direct exports to foreign importers, an ordinary export mode. (2) Export to overseas wind farms projects developed by Chinese investors. (3) Export driven by the exporter’s own investments holding of overseas wind farms, a form of exploration exports (Zhang, et al., 2015). Companies can concentrate on a single export modes or combine them to accelerate their internationalization, attacking the market on a wide front.

Throughout the analysis, this thesis will build on (Osterwalder & Pigneur, 2009) business model definition and regard sustainable changes in the business model as business model innovation. The business model canvas will be used to explore Envisions business model to try to identify if their model contains any unique components which can be connected to their rapid success. As Envision recently initiated an internationalization process, entering several continents as the same time this thesis will explore the drivers of their internationalization and
if the process can be regarded as an accelerated internationalization according to (Tan & Mathews, 2014), and how they will use the export modes presented by (Zhang, et al., 2015).
3. Methodology

3.1 Research Approach
Research can be conducted and based on different techniques. Choices in theoretical and methodical approaches needs to be reflected upon, as considerations about epistemological and ontological position. The theoretical approach leads to the choice of deductive or inductive research and the methodical approach is a decision to conduct a qualitative or quantitative study. Epistemology is an orientation which describe how the social world should be studied and are divided in positivism and interpretivism.

3.1.1 Deductive or Inductive
In the process of theoretical business research there is two main research approaches: deductive and inductive. They describe the relationship between literature and research, and choices of letting the theories drive the research or if theories should be regarded as a product of the research process. The choice has implications for concepts and what empirical data which is collected in the investigation. A deductive approach is the most common and are based on building a hypothesis of known theories about a domain and then subject it to empirical scrutiny. This approach let the theory and hypothesis guide the collecting of data in order to test and prove what is already known. The inductive approach is freer and are based of observations of a phenomena resulting in new theories (Bryman & Bell, 2015). This study takes a more inductive approach letting the observations and found patterns guide the research to new findings.

3.1.2 Epistemological Considerations
Epistemological considerations focus on how the social world should be studied and what should be evaluated as acceptable knowledge in different disciplines, positivism and interpretivism. Epistemological considerations are to be aware and question the methods to acquire knowledge and the content that is gathered. Different assumptions and views exist on how research should be executed and therefore influence the outcome of a study. Positivism is an epistemological position that suggest the application of the methods of the natural science to the study of social reality. For some, it is a philosophic descriptive category, for others it describes quantitative data collection. Positivism is the epistemological position that work with hypotheses that can be tested, evaluated and used to explain, by looking a phenomenon where research material has been conducted in an objective manner. In 1960 a dissatisfaction emerged about the limitation of the orthodox positivism, a new alternative position called interpretivism started to take form. By taking a different approach from explain to understand why, a new way of conducting research was needed. This can be related to qualitative studies where researches can come up with surprising findings since they not looked in a hypothesis to the same extent and also emphasized a respect between natural and social science (Bryman & Bell, 2015). From an epistemological perspective this study has taken an interpretivism path since no hypotheses was conducted before the data collection and not trying to explain why but more understand how.

3.1.3 Ontological considerations
Ontology is a philosophy which concerns the nature of a social units. The central questions are if social entities are to be seen as an objective or something created, by built up perceptions and actions of social actors. These two different approaches within the philosophy is divided in objectivism and constructionism. Objectivism sees social phenomena as facts, something existing but beyond our reach or influence. Nothing we do will change what “is” and therefore we have to adapt to the set rules and laws in best possible way. By thinking in these terms individuals are marionettes to the system, controlled and scared to obedience.
They learn to follow the rules, laws and values without questions why, in order to be accepted by others. The system is seen as something external which dictates the way to live, act and think. Constructionism is an alternative ontological philosophy which refer to the social phenomena as general understandings instead of set commands. This understanding is not seen as an external reality, more like something that evolves with internal and external factors. By questioning why, a process is started which could lead to changes in the system. Internal and external forces work on the system to make it better by small innovations. This leads to a healthier system with better conditions for internal and external resources (Bryman & Bell, 2015). Looking back at history and the change for the better, this thesis is written to raise the understanding and questioning the why in a constructionism spirit to add to the research field of business model dynamics.

3.1.4 Quantitative or Qualitative
It seems like the qualitative and quantitative research method is mainly distinguished from each other by the fact that quantitative research uses measurements and qualitative do not. But the differences lie deeper and are rooted in research approach, epistemological and ontological position. Quantitative research methods rely on analysis of numerical data and statistical analysis of secondary data. The method entails a deductive approach and emphasis on testing theories. The method also incorporate the scientific model of positivism and objectivism (Bryman & Bell, 2015). Quantitative research contains a large number of samples, objects or participants in order to increase the ability come to general conclusions (Yin, 2015). Qualitative research however emphasizes word from primary data and take an inductive approach in the relationship between theory and research. In contrast the method entails an interpretivism and constructionism as epistemological and ontological position. Qualitative research is recognized to conduct a deeper and reflecting investigation of a phenomena in order to increase the understanding (Bryman & Bell, 2015). This thesis considered a qualitative study by conducting interviews and analyze new observation.

3.1.4 Literature Review
After considering and outlining theoretical and methodical approaches a search for relevant literature was conducted in the chosen domain. Halmstad University has been the main source of hard books, scientific articles and journals through their website. Other databases used are Chalmers library and Google scholar. Different agencies and research consultants has been used to provide an update of the current energy and wind power situation. Information from cooperate websites has been used together with material from interviews to describe the companies mentioned in the thesis.

The main keyword used for searching for information and literature has been: Business model, Business model innovation, business strategy, strategic management, business management, innovation management, wind power (industry/market), wind energy (industry/market) and emerging economies.

3.2 Research design and research approach
The research approach is the first choice a researcher need to decide on, but two other choices remain, research design and research method. Research design makes up a framework for the collection and analysis of data. The research method describe what technique used to collect the data (Bryman & Bell, 2015).

A single-case study design allows the research to explore and investigate a single organization, person, event or location. This thesis explores an organization through a qualitative perspective with interviews and observations. Case study design is one of the most
common research strategies (Yin, 2015) According to Saunders et al 2009 case studies suit research that aim to gain a rich understanding of a context. In order to explore and understand Envisions business model and internationalization strategy the design was desirable. When adopting a case study design an unstructured interviewing is favorable, since the method help generating intensive and detailed data (Bryman & Bell, 2015). When conducting a single case study is common to combine primary and secondary data. Primary data is collected through interviews and observations while secondary data is data that has already been collected for another purpose (Eriksson & Wiedersheim-Paul, 2014) A semi-structured interview was used to provide insight in Envisions business model and their internationalization strategy. Why and how is described in the following steps.

1. **Research questions** – A literature study was carried out to understand the fast growing wind power industry. The finding that DMNEs business models has an advantage over EMNEs business model in emerging economies (Campell, et al., 2014), together with the observation that the wind power industry dynamics was changing (Pataci, et al., 2015) presented an opportunity to add to the research field of business model innovation in the wind power industry, by studying a DMNE operating in the international market.

2. **Selection of case company** – The original research idea was to conduct a comparative study between a DMNE and an EMNE business models, due to difficulties to establish contact with a DMNE in northern Europe the study chose to focus on the Chinese EMNE, Envision Energy, and to explore the underlying factors of Envisions successful business model, and the drivers for their internationalization.

3. **Data collection** – The data was collected through a 90 minute recorded semi-structured interview in English with the head of business development for Europe, Africa and Middle East, and gave detailed insight in the company’s business model and internationalization phase. Secondary data was collected to put the primary data in perspective.

4. **Data presentation** – The collected secondary data was presented to build up and understanding of the current wind energy industry and it dynamics. The primary data was transcribed and was used to present a detailed description of the company and its operations in empirical findings with quotes.

5. **Data analysis** – In the analysis, data from empirical findings was connected with theory which allowed a discussion of the implication of Envisions organization.

6. **Conclusions and observations** – Through the analysis and discussion, conclusion could be drawn to answer the thesis research questions. Observations of opportunities and challenges for further research was presented.

### 3.3 Research strategy

As this thesis aims to explore the underlying factors of an emerging wind power company’s successful business model, and the drivers for their internationalization. A suitable framework of references was put together to be able to understand and work with the collected data about the case company. A semi-structured interview was the carried out to collect in-depth data which focused on essential part of how the case company have built their organization, what drives them to the international market, and how they plan to establish themselves internationally. The interview resulted in rich and insightful empirical data that revealed new
information about the organization business model, enabling them to move into the international market. The interview findings were then connected with secondary data about the global wind energy industry development, which address the play field for the thesis, the Chinese wind energy market development, which reveals the routes of the case company, and the case company itself to complement the interview data (see figure 3).

![Figure 3. Research strategy](image)

In the analysis, the framework of references is linked together with the empirical data in order to present reliable and relevant analysis of the presented research questions. Here the secondary empirical data adds a perspective value which allow a reader to understand what is unique with the case company and what is not, in the big picture. More detailed differences are brought up in the text which leads to a discussion of the case company’s challenges and competitive advantage in their business model. The most contributive factors for the case company’s successful business model, and the drivers for them go international is then presented in conclusion.

3.3.1 Case company selection and interviewee

This thesis studies the wind energy industry and a company which has a key part in the new industry dynamics. The selection criteria for the case company was that the company had to be a EMNE in the wind energy industry and preferably have an office in northern Europe so a face to face interview could be held.

The case company is one of the fastest growing wind energy company in the world which since the establishment in China, 2007 has reached the global top 10 list in installed wind energy capacity in 2014 and continued to climb the list in 2015. The company is a smart energy solution provider which want to be a driving force in an energy revolution that will solve the challenges for a sustainable future.

When contact had been established with the case company a discussion of who was most suitable to give insightful information considering the thesis scope was held. The head of business development for EMEA where approached by email and phone with an introduction of the research topic and the potential to shed light into unexploited research territory. The interviewee agreed upon an interview which took place in March 2016.
The interviewee is an experienced professional in the wind energy industry which has had several management positions since his industry entry in 2007. Before joining Envision he had strategic leadership roles at two of the biggest wind energy companies in the world. Now he is running Envisions business in Europe, Middle East and Africa, working with business development, opportunities and market entry.

3.3.2 Interview guide
When structuring the interview guide the framework of references worked as guide together with the wind energy industry review, which formed the topic and the research question of this thesis. By construct an interview guide (see appendix 1) with open questions, where the interviewee could interpret and answer the questions freely, allowed a collection of rich and insightful data (Bryman & Bell, 2015). Part from open questions, the interview guide was structured to give a story of the case company’s business model from establishment to current operations and then their predictions of the further. Having this semi-structured interview guide, the interviewee could develop the questions as far he wanted and even lead into new subjects.

3.4 Time horizon
The longitudinal study design is regarded as typical way to map change in business management since it explores a phenomenon over time. Through collected data of mechanisms and processes the method raise the understanding of which changes as created. However, partly because of the time and cost involved, longitudinal studies are rare in business and management research, and therefore found as an extension to cross-sectional studies (Bryman & Bell, 2015).

Cross-sectional studies regard one or several phenomena where the data are collected within a short time-span (Bryman & Bell, 2015). This thesis due to the difficulties to establish contact with case companies is based on a single interview, giving it a cross-sectional time horizon, but also used secondary data to explore changes over time, giving the thesis a combined design.

3.5 Research Ethics
Ethical consideration is an important factor when conducting academic research, to prevent harming, or in anyway violate the interviewees privacy (Bryman & Bell, 2015). Such harm can also lead to a negative effect for further research, causing a lose, lose situation, therefore research ethics should always be a high priority. Having this in mind, the interviewee was given a presentation what the research was about, purpose and that is voluntary, before asked for permission before to audio-recorded the interview. The interviewee was also informed that the audio-recording would be transcribed in order to lift out quotes, to increase the empirical findings credibility. Arrangement was then made to let the case company take part of the thesis and results before publication to confirm the that content was fair and precise without factual errors.

One of the most valuable assets for an individual and businesses is time, the interviewee was given a special thanks for participating in the interview and sharing information which made this thesis possible. To not cross research ethical boundaries, the interviewee identity is held anonymous without interfering with the credibility he gives as an industry professional.

3.6 Research quality and trustworthiness
To ensure high quality in a qualitative research it important to build trustworthiness, this can be done by adopting one out of two views of concept which both contains four factors. This thesis has chosen to certify the trustworthiness by referring to the four factors, credibility, dependability, conformability and transferability.
3.6.1 Credibility
The credibility factor addresses multiple accounts of social reality and the awareness of several plausible aspects of the same phenomena can be found. In other words, credibility is addressed in social research to “ensuring that the research is carried out according to the canons of good practice and submitting research findings to the members of the social world who were studied for confirmation the the investigator has correctly understood the that social world” (Bryman & Bell, p. 401, 2015). To let the interview responders review and validate the research is a common from qualitative researchers, since “they frequently want to ensure that there is a good correspondence between the findings and the perspectives and experiences of their research participants” (Bryman & Bell, p. 401, 2015). This thesis aims to be a contribution in the field of business model dynamics in the wind energy industry and was therefore sent to the interview participant for validation, to ensure a high credibility.

3.6.2 Dependability
To establish trustworthiness, dependability has been addressed as “researchers should adopt an auditing approach” (Bryman & Bell, p. 403 2015). To ensure good dependability, this thesis is built on an audio-recorded interview which has been transcribed to enable auditing approach where quotes has been used to strengthen the interview findings. The entire interview material with audio-recording, transcription and notes has been kept from all phases of the research process (Bryman & Bell, 2015).

3.6.3 Conformability
Conformability addresses the objectivity in research. Even though “complete objectivity is impossible in business research” (Bryman & Bell, p. 403, 2015) it important for the research quality to stay as objective as possible to ensure that personal values or theoretical inclinations do not lead to misinterpretation of findings. Having no previous connection with the case company or the interviewee the thesis has been based on the audio-recorded interview only and used in a objective manner.

3.6.4 Transferability
Transferability address that “qualitative findings tend to be orientated to the contextual uniqueness and significance of the aspect of the social world being studied” (Bryman & Bell, p. 402, 2015) This thesis address the context of business model dynamics of the wind energy industry which can be viewed as subsidiary to the whole energy industry. Rich and detailed findings, significant for Chinese EMNE and have been described, making it possible to apply on similar EMNE operating in the same industry with similar market conditions.
4. Empirical Findings
This section presents the empirical data that has been collected throughout the study. Chapter 4.1 and 4.2 has been gathered through secondary sources. The data about Envision in chapter 4.3, 4.4 and 4.5 has been collected through one semi-structured interview, Envision Energy’s website and other secondary sources, further the quotes used was taken from the interview data.

4.1 The Wind Energy Industry
Since the mid 1990s the wind power market has roughly doubled every four years, but a slowdown can be spotted in the most recent period, see figure 4. However, wind is blowing away competitors on price, performance and reliability and new emerging economies like Africa, Asia and Latin America will become the market leader of the next decade. The fears competition on the market has pushed turbine development immensely and increased the areas where wind power is the competitive option (Global Wind Energy Council, 2015).

Wind is one of the fastest growing energy sources in general and in electricity in particular (Busby, 2012). Wind energy supplied an estimated 3% of the electric demand in 2015 (Global Wind Energy Council, 2015). By 2020, that energy could meet 9% of the global energy demand (Busby, 2012).

The Wind Energy Market is a relatively new market with its original stronghold in Europe. Vestas (Denmark) the most dominant player on the market had more then 25% of the market in 2006 and together with Enercon (Germany), Gamesa (Spain) and Siemens (Germany), the four enterprises controlled more then 60% of the global wind market (Pataci, et al., 2015). The spread of cumulative installed capacity was mainly found in Germany 27.9%, Spain 15.7%, US 15.7%, India 8.5% and China with 3.5%, see figure 5.

Figure 4: Global Cumulative Capacity (Global Wind Energy Council, 2015).
Since 2006, the global wind map has changed. China accompanied by India, an increased energy demand and raised environmental awareness is the under lying course for the transitioning. In less than a decade the center of gravity for wind power has moved from West to East in terms of cumulative global capacity, which between 2006-2015 grew with 585%. The five countries with most cumulative capacity is now China with 33.7% of the global market, followed by US 17.3%, Germany 10.4%, India 5.8 and Spain with 5.3%, see figure 6).
There is also a major shift to be seen between turbine manufactures. In 2014 a total of 51GW was installed, were Vestas accounted for most installed capacity 12.3%, followed by Siemens 9.9%, GE 9.1% and GoldWind 9.0% (Navigant Research, 2015). In 2015 new installed capacity hit 62GW, with Goldwind as the biggest contributor with 12.6% followed by Vestas 11.8%, GE 9.5%, Siemens and Gamesa tied at 5%. Noticeable is that 29GW was installed in China and on the top 10 list of 2015 in terms of installed capacity, five Chinese companies (GoldWind, Guodian, Envision, Ming Yang and CSIS) is listed. This can be linked to the Chinese manufactures rushing to complete projects to qualify for a more lucrative feed in tariff that expired in the end of 2015 (Bloomberg Business, 2016). Despite less support system by the Chinese government, the Chinese wind power manufacture has become good at what they do and are now starting to establish themselves outside their domestic market.

4.2 The Chinese wind power market and development
The Chinese Wind Energy market has grown immensely in the last decades. In 2000, the cumulative installed wind capacity in china was only 340 MW, which grew to 12GW in 2008 and reached 115GW in 2014 (Ru, Zhi, Zhang, Zhong, Li, & Su, 2012; Global Wind Energy Council, 2014). In 2005 the maximum turbine size Chinese manufactures build was only 750 kW, just five years later in 2010 the Chinese manufacture Sinoivel began to produce 5 MW machines. The rapid development can be explained by the enormous market opportunity and the institutional support that has promoted the technology development in the Chinese wind turbine manufacturing industry (Ru, et al., 2012). China processes a huge land area and a long coastline suitable for wind energy. The Chinese Meteorological Administration has estimated that the country can develop 3 500GW of onshore wind generation and another 200GW in shallow water up to 25 meters deep (Busby, 2012).
One indicator for the tremendous technology development in the Chinese wind energy industry is to look at its innovation and numbers of patents registered and related to the industry. Back in 1985, there was only 13 patents related to the industry, in 2002 that number had rise to 522 and in 2008 reached 1132. However, the Chinese companies only account for a fraction of the total number of patents registered, 16.7% in 2010. The transition of wind turbine innovation in China can be divided into four stages (1) early R&D activities pushed by the government (1970s – 1996), (2) imitative innovation based on technology imports (1997 – 2003), (3) Cooperative innovation including collaborative design and joined venture (2004-2007) and (4) indigenous innovation based on enterprise internationalization and R&D globalization (2008-present), see figure 7 (Ru, et al., 2012).

Figure 7. The dynamics of Chinese wind power development (Ru, et al., 2012)

The first stage was driven by public policy, especially the central government R&D funding support which encouraged companies or innovators to build a foundation for wind turbines. Individual firms, local cooperation R&D and reverse design emerged as the new innovation methods. In 1988 in a collaboration between several institutes, the first 200 kW design emerged and later in the mid 1990s they managed to batch produce 100 kW turbines (Ru, et al., 2012).

Entering the imitative period (2), joint venture and licensing became a dominant method to import foreign technology into China. This was initiated by the Chinese government in the *riding the wind* program, which encouraged R&D of 600 kW turbines, but also emphasized to absorb advanced foreign technology based on technology and equipment importation. In this period the Chinese manufactures learnt “know how” and improved their technology capabilities. In the 1999 and 2001 the Chinese manufacture Goldwind managed to build 600 kW and 750 kW turbines (Ru, et al., 2012). Already five years earlier (1994) the Danish company Vestas had managed to build their V44 able to produce 600 KW and supply the grid with an even electrical output, first time in wind power history (Vestas, 2016).
The third stage began with the development of a 1.2 MW turbine in a collaboration between the state owned Goldwind and the German firm Vensys in 2004 (Ru, et al., 2012). Vestas had the year before lanced their new V90 turbines, V90-1.8MW, V90-2.0MW and V90-3.0MW (Vestas, 2016). In this period collaborations and joint ventures became common for the Chinese companies to established and carry out R&D. However, the leading companies in the market as Vestas, GE and Enercon preferred to build and establish themselves on the Chinese market rather than sharing their technology expertise (Ru, et al., 2012). In fact, Vestas merged with NEG Micon, another Danish company in the wind industry, making Vestas the undisputed world leader in the industry with a 32% market share (Vestas, 2016). In this period licensing was reduced and local actors started to conduct more cooperative innovation. An example of that is Goldwind, which embarked on their collaboration with Vensys, and managed to take the development of the 1.2 MW turbine to prototype in 2005, and under the next four year develop it to a 1.5, 2.5 and 3.0 MW turbine. The transition from imitation to cooperative innovation was mainly driven by the rapid growth in the wind market and change in policies. A new program The Wind Power Concession Project was started as a result of Chinas new strategy of becoming a sustainable innovation-orientated country. Creating large scale projects (100 MW) with a total cumulative capacity effect of 3350 MW between 2003-2007. Attracting players through bidding and in the same time, set a mandatory minimum localization rate of 50% in 2003, and 70% after 2004 accelerated the development tremendously (Ru, et al., 2012).

The increased market demand continued and exploded in to the forth period of indigenous innovation. Many Chinese manufactures, boosted by The Wind Power Concession Project that ended in 2009, now started to master the ability to conduct indigenous R&D through the whole innovation process. An example is Sinovel that through indigenous innovation obtained world leading technology to produce 5 and 6MW turbines in 2010 and 2011 (Ru, et al., 2012). The Chinese manufactures now started to globalize and establish R&D facilities internationally. Merger and acquisitions is key in this process. Goldwind acquired 70% of their former German collaboration partner Vensys, gaining access to world leading technology and professionals, as well as entry to the European market in 2008. As the Chinese companies becomes more and more competitive in the international space. The Chinese Government strategy changed and they started to reduce the trade protection for the domestic companies, seeking open market conditions (Ru, et al., 2012). One advantage the Chinese companies holds going into the international space is their vertically disintegrated value chain. Few components are manufactured in-house, giving the Chinese manufactures leeway and flexibility (Lema, Berger, Schmitz and Song, 2011).

4.3 Envision History
Envision is registered in China as private owned and was founded in 2007 by Zhang Lei, a former energy trader in London. During his time in London he saw that wind energy had a strong potential to work as a catalyst to realize his vision of “Solving the challenges for a sustainable future”. He wants to challenge the energy sector and transform an arcade sector into a modern energy sector for the good of mankind, by revolutionize the industry through advanced technologies. Zhang Lei is very strong to correct people stating that Envision is a wind turbine manufacture. Envision is a smart energy solution organization, operating in the whole renewable energy sector, wind turbines are just one aspect of delivering on the global energy internet as far as he is concerned. He drives the organization thinking about solutions for the future. Starting from scratch Zhang Lei recognized that he needed good talented people from the industry to take the technology forward, not just in China, but technology
meeting international standards and requirements in order to one-day reach the global market and realize his vision.

“But in fact that envision started in 2007 and the key to our success since 2007 is that Zhang Lei, recognized that he needed good talented people from the industry to take forward the technology that was as least on pile with the international standards.”

The design and manufacturing of wind turbines is highly knowledge extensive and sophisticated, and the supporting software platform required deep know-how in both energy management and information technology. Zhang Lei sourced professionals with world-class capabilities and offered them greater sense of meaning in their work, an opportunity to lead the industry forward (Ready, Hill & Thomas, 2014). With the new found competence they established themselves globally with a Global Innovation Center in Denmark, a Global Digital Energy Innovation Lab in Silicon Valley and other places that marked the beginning of their global wind energy network.

“So he (Zhang Lei) brought in a lot of international players from the early stage in 2007/2008 [....] so effectively he bought the history.”

Doing so, the company could leapfrog through the long process of learning as all the other actors as Vestas, Siemens, Nordex all been through. That significant learning curve the others companies have been through has formed the industry. Zhang Lei’s unique decision to skip that learning cycle and buy the history by bringing in a lot of specialist from competitors as GE, Vestas, Siemens, Gamesa and others, enables Envision to explore unexploited territory. Since they started with the knowledge and not the baggage in form of platform, design and facilities, they hope to start a new chapter in energy history, with their innovative technical capabilities and use of proven technology.

“[....] rather than go through that long process of learning, his mindset was that I want quality leading product and I want it to be to the international standards.”

Coming from China as a company aiming to revolutionizing the energy sector through technical innovation and quality, one of the first things Envision had to do was to convince and change the China model.

“Second initiative is changing the model in China, bringing in a high quality product, but still leverage in the supply chain in china to maintain a cost base that the customers would still purchase in China. But recognize it as quality product because it proven technology.”

When Envision entered the Chinese market, the technology that was being installed by Chinese competitors was somewhat substandard, compared to the to international players as Siemens, Nordex and others that had entered the Chinese market. They somehow needed to compete with the low price their Chinese competitors offered and the high quality offered by the globally recognized players. Their solution became a high quality product, with proven technology using internationally recognized suppliers that are leading on what they do, but leverage in the supply chain in China to maintain a cost base that the customers still would purchase in China. So inside the turbines it is a Winergy gearbox, ABB generator and blades from LM, all companies leading and with more than 30 years of experience of what they do. Only a few Chinese brands can be found inside the turbine.

“So that’s the other part of our success, so high quality, proven technology, proven supply chain, and that accelerator envision in terms of the success in China.”
When Envision decided on turbine design, they used the combined knowledge that was bought in from industry specialist from the leading companies. By analyzing the history of the industry and different part of the turbines they could see what parts from which manufacture that had the most proven technology and quality. Their first choice was between a geared or gear less product. The decision landed on a geared solution and they started to reach out to their supply chain. Winergy is a very strong supplier to the industry and after a satisfied analysis of their statistical analytical report on a suitable gearbox they started to investigate how proven the technology were. What turbines on the market used that gearbox, what know problems could be found and so on. They got convinced that the Winergy gearbox was the best in class and decided to use it as reference point in their new platform. The same approach was used when constructing and choosing other part for the turbine, and then they system integrate it all into a satisfactory product.

“So our designs are an evolution of what product is available and how can we system integrate that product.”

Being a Chinese company, Envisions methods was a bit unorthodox, many Chinese manufactures emerged from buying their design from the self-design. And most of the Chinese competitors at the time when Envision emerged had gone over to a lot of in-house design and manufacturing using domestic suppliers which didn’t really had experienced the industry learning curve. Therefore, many of them failed to understand the need of quality and the work load the parts needed to be able to endure. Due to changes in weather conditions and change in dynamics, barring failures is common due to the high stress load the wind causes. As result of these sort of failures the Chinese customers started to recognize that they didn’t want cheap products with less quality. It is costly and time consuming with a broken turbine. They started to want reliable quality products that generated electricity on an hourly basis. It was in this period Envision started to become recognized as one of the premium quality leaders in Chinese wind energy market.

“Rapidly the China customers stated to recognized that they didn’t want cheep products that didn’t fulfill their design criteria and what they were looking for. They want a quality product like anyone else because they need to generate electricity on an hourly basis, so they need it to work”

But the China now and back in 2008 is to different worlds. Going back in time, quality was defiantly not a priority, it was more about producing turbines, and it didn’t really matter if they could produce reliable energy or not. It was more a market race in technology development in China then anything, and in that rapid development phase essentials as quality of the turbine and electricity transfer was overlooked. This was one aspect why the international organizations found it really difficult to enter China. Vestas, Siemens and others had a quality product with proven technology that worked, but the clients didn’t actually want to pay for that quality. As a Chinese player focusing on reliable quality products, Envision had to work the Chinese market and convince customer that a higher purchase price could give a lower cost of energy.

“What envision has managed to do, is to move the client to move along the buying motivation forwards a more quality product that works.”

The demand for renewable energy sources in China have been increasing due to global environmental pressure. China is now heavily involved in the emission agreement reached in COP 21. One reason is that they start to recognize the smog in Beijing as a big issue and that the political pressure in China has forced them to take action towards better health and
environmental conditions. One aspect in addressing this issue is wind energy, and as a brick in their national plan they need increased reliability from wind as energy source.

"Beijing and the smog is big issue. So the public and the political pressure in china has forced them to say that wind is important"

This has forced clients in China to move against quality, towards Envision. So by taking a quality approach in the initial stage of the company, Envision has managed to enter the market in 2007 and reached the top 3 and top 10 list in china and globally in 2015. They have also become a recognized global player without doing a great deal of international business.

“Envision was there to respond to that mean with cutting edge product with quality which the others did not have.”

Envision has managed to build a strong organization in the Chinese market, emphasizing on quality and development of new innovative solutions for a lower cost of energy. With a strong position in their home market as trustworthy and reliable turbine manufacture, Envision has recently initiated an internationalization process where their learnings in their home market will be combined with the knowledge of their human resources to further grow and gain market shares internationally.

4.4 Envision Moving into the International Space

Zhang Lei is adamant that Envision has to become an international player in order to influence the energy industry, which is the vision of Envision. It is a process to transitioning their learnings in China into the international space, because many aspects are different. One example for instance is that in China, a lot of products is under the customer scope, meaning that the tower for a turbine isn’t part of the supply from Envision. They help and support the customer, but the customer takes on the responsibility to put the tower into place. International turbine manufactures deliver a full turn key solution to the customer. So the international scope is different and Envision has to build an organization that can deliver on the international conditions.

“[...] to influence the energy industry we need to be an international player so that is the drive why we internationalizing the organization. But the learning for Envision right now and has been for the past 4 years as long as I known them is that international business is significantly different from the china business needs”

In the Internationalization process, Envision will use their industry expertise and learnings from others. They have seen how the international players like Vestas wanted to enter the Chinese market because of the big market potential the country has. But they hit barriers of entry into China because they failed to understand the importance of product fit and the market in general. They have also seen Goldwind becoming number one in the world. Even though most of Goldwind’s business success lies within China, they have working in the international space, and in that process Envision has picked up some key learning of what they tried to do. Due to the distinct difference in market place, Goldwind did some fundamental error that Envision isn’t prepared to make. In the industry reputation is key, and it only takes one fundamental error to tarnish that reputation. Goldwind and others who moved into the international market, expecting that the market would be very similar to china have been forced to rethink their global expansion. Every market has its different requirements and Envision has been aware of that from the beginning. In the last four years they actively been working to prepare themselves for the international market. Addressing their technology standard to meet the international market requirements. Researched certifications that is not needed in the Chinese market but most defiantly are in the
international space. Looked into local laws and regulations to make sure that their technology and processes comply with future markets requirements.

“We have been very strong and been able to respond in the market in china, we are now building an organization to be as strong to respond on the international market. [...]. Vestas and others hit the barrier of entry into china because they didn’t have product fit. [...]. We have seen some key learning of what they (Goldwind)) have tried to do, because it is a distinct different market place then china and they have made some fundamental errors”

Laws, regulations and incentives for wind energy evolve and change to accommodate the wind industries maturity level. Denmark is now the most mature wind energy market in the world were more than 40% of their electricity in the grid comes from wind turbines. In the beginning Denmark had support systems to fuel the industry to attract customers to see the opportunity with wind energy. But since wind is not a stable fuel, it takes time to find methods to integrate wind energy into the grid system, and the grow phase was controlled by those support systems. But when solutions are found the market reaches new maturity levels that almost need to slow down the industry, but still bring it in a phase that fulfill the ambition of that country. Sweden’s wind energy market is such an example, were the market was stimulated by green certificates, but as the installed capacity grew the certificates declined in value. The solution with green certificates has allowed the Swedish wind market to grow in a sustainable way and created a mature market based system. Other European markets have also demonstrated a high level of maturity, changing to an auction based system were the industry are bidding for energy power plants to be installed into the system at a price level that is competitive with the cost of energy from other sources such as gas, hydro, thermal or solar. The global long-term commitment of making renewables cost competitive has started to pay off and the cost of energy is now the biggest debate.

“What I think is a key sign of maturity is when the market starts to just change their policies to accommodate the high scale wind power as a part of their energy mix, but also changing their support systems. [...] And in Europe most market is evolved into a more auction based system and the lowest cost of energy will get the installed capacity.”

China hasn’t reached the same maturity yet. But the Chinese wind market used to be protected and rely on a lot of support systems and now those support systems are decreasing. Meaning that the companies that heavily rely on those support systems will enter a tuff period, while companies as Envision, how does not rely on incentives will stand even stronger. Envision stands ready to compete with the international players in an open market. And recognize that even under an auction based system there is an energy revolution that need to happened, to be able to really bring the cost of energy down. With their hardware, software and whole approach to the energy internet, Envision hope to move as a key supplier in the energy revolution. But the industry is not their yet, and to realize the vision of Envision they also have to establish themselves outside the Chinese market.

One of the biggest challenges moving into the international space is that Envision as a brand is not proven internationally. In China Envision are recognized for their quality standard and as a well trusted partner. Internationally, customers have heard and read about them, but since the finical crisis in 2008 the market has gone risk adverse, meaning customers don’t want to take risk, they want to invest in proven technology and capabilities. Therefore, the challenge lies in penetrating the market in order to show customers that Envisions technology meet international standards.
“We can be a game changer to the current norm, but our problem is because of this risk adverseness we are unknown, we are not proven as far as international banks, finance and developers are concerned.”

The western hypotheses of China are that; Chinese products are cheap with less quality, that they have a lack of technology understanding and that they have a fix it later or not at all attitude. Those preconceptions are big barriers for Chinese companies when wanting to enter the international market.

“The way I describe one of our barriers is the pure hypotheses of china, from the western world. So cheap product, lack of understanding, fix it later on if we fix at all, and cheap.”

Envision are working with three ways of penetrating the international market. The (1) way is trough traditional export to customer. (2) Is to bring Chinese customers that want to establish themselves internationally and leverage that they are a proven and trustworthy Chinese client, with capabilities to take their customers into the international space. Or (3) attract international customers by showing them Envisions technology and capabilities by building a showcase, a park funded from their own pockets so the customers outside China can see their technology and operations with their own eyes.

“So find the customer, either we can take the customer from china into the international space, or work within the international space with the customers and then bring those values that we know they want, and that will drive us into the international market.”

In 2015 Envision bought such a project in Kajfärden, Sweden, a 25 MW project were Envision will display four of their EN-120/3.0MW and five of their EN-115/2.3MW turbines. Envision use the Swedish company Skanska as a contractor when constructing the park. Skanska is one of the world’s leading project development and construction groups. The park will go operational during 2016 and will be used to let customers, banks, engineers and key stake holder see the technology and not just hear about it. The showcase is an important part of Envision’s internationalization strategy where they can demonstrate that they are more then a China model, they are an international model and have been since the start. The EN-120/3.0MW turbine was developed at Envision’s Global Innovation Center in Silkeborg, Denmark, which was established in 2008. Envision can and will leverage their presence in wind energy’s point zero when attracting customers and start competing with the established European rivals such as Vestas and Siemens.

“I can speak clearly to customers and say we are not a china model, we are an international model and have been since the start.”

Envision is entering the international space with a generic approach, meaning they do not target specific markets due to the risk it poses. Market forces can change very quick because of changes in politics.

“So we are quite generic in our approach into the international business, we have clear goal of what we want to achieve but breaking that down into absolute market numbers we don’t do that right now at envision. It is to risky.”

The United Kingdom is one example of that, the market is now going cold due to the political decision to remove most the incentives for wind energy and customers move on to other market with more business opportunity. Envision aim to let the customers take them to the market in customer lead strategy and not the other way around. And they are now preparing themselves by building a project management office in Hamburg to be able to meet and support the demand for their product in the European market.
4.5 Envisions Products and Services
Envisions has responded to the global energy and environmental challenges by integrating worldwide R&D and innovative recourses to be able to offer a wide range of turbines and unique software. In 2010 Envision developed the world's first smart wind turbine for low wind speed sites, which through a software-defined turbine approach have breached the technological limits of traditional wind turbines. The smart wind turbine can increase the efficiency of power generations by 20% and has been part of the rapid development of the Chinese wind energy, which's wind recourse consist of more than 60 % of low wind speed areas (Envision Energy, 2016).

Combining the know-how from the Chinese market and the competence of Envisions Global Innovation Center, Envision is now launching their first real international turbine with a DVL GL certificate, the leading certification body in the world, ensuring that Envision can offer a solution to all markets. The EN-120 3.0MW turbine has a wing diameter of 120 meters and consist of top-shelf industry suppliers like LM, SKF, Winergy, Siemens and ABB. The hardware piece may not look unique, but Envision has managed to merge things together making it more compact. This brings down transportation and assembly cost and add value to their turbine (Envision Energy, 2016).

Another innovative solution that challenge the cost of energy is the GC-1 3.6MW two bladed offshore prototype, also known as “the game changer” that successfully has been running for more than two years in Denmark. It is the world’s first turbine to use partial pitch and carbon fiber main shaft technologies which enables the turbine to reduce extreme loads of the whole structure by 30% during typhoon conditions. That opens up for less material in the foundation, the tower and in the turbine. And the two-bladed partial pitch system means faster, leaner and simpler assembly, installations and better serviceability. All adding up to a lower cost of energy (Envision Energy, 2016).
Envision offers more than innovative hardware. Together with smart devices, smart sensing and control technologies, advanced software and communications platform, Envision is building an Energy Internet. In order to upgrade the efficiency of energy generation, energy consumption and energy transaction, but above all, driving the digital revolution in the energy industry. The Global Digital Energy Innovation Lab in Silicone Valley is drawing the latest thinking in cloud based thinking and solutions and the company now possess a large patent portfolio in the US. Unique with Envisions technology and approach is that their software fits any renewable asset as solar, hydro, biomass, and not just wind turbines. The software is developed so it can be overlaid on any assets, including their competitors in the industry.

“And what is the key game changer in the industry is that our software can fit any assets, any renewable asset, not just wind assets, so wind, solar, hydro, bio mass and the software is developed so it can be overlaid on any assets including our competitors in the industry.”

The traditional software offered by industry manufactures as Vestas and Siemens is developed for their hardware only and has been difficult to navigate. What Envision has created is a user-friendly overlay system that can go on any wind turbine type. They act as first movers to integrate IOT (internet of thing) which is a network of physical objects embedded with electronics that enables these objects to collect and exchange data in an open interface for
renewable assets. One software, which connects multiple renewable assets from different manufactures is something new for the energy industry and starts a new chapter in energy history.

“so we are the first mover to do that as well, so again back to innovating thinking and entrepreneurial thinking, changing the energy system u need to do these things and that’s why we are leaders in that space in terms of software solutions”.

The new cloud based software allows Envisions in a fully holistic approach to connect the hardware with the software in their product offering. With cutting edge hardware- and software technology, world class project- and service management, Envision can handle the whole lifecycle of their offered assets. The hardware is the cash generator but the lifetime of the assets and how to control, run and maintain it, is what produce efficient kWh. Envisions smart wind farm lifecycle management system, is a powerful tool in asset management for developers. Where the cloud technology connects the entire life-cycle management procedure of wind farms, from farm design and farm operations to post-constructions assessment and helps developers improve the wind farm designing efficiency by more than 20%.

“So it is a full holistic value approach that we are working on and the software is about the asset life all the way through to the final days.”

The open interfaced software allows clients with Envision’s support to create their own smart wind farm lifecycle management platform. The overlay system is also a way for Envision to build a customer network were they can attract customers for their hardware. Envision hope to drive the energy sector into new era where the combined value of all their solutions is much higher than the individual components in an energy internet.

“[...] knowing Envision without actually buying any hardware. They got our software on their assets so it seems that we are solution provider. Which helps us again build this level of trust, for the guys that are risk adverse.”

Beside technology, Envision is bringing a new way to conduct business to the international space. Vestas, Siemens and other strong players internationally have invested in huge production facilities and are very much vertically integrated. It is a result of wind power history and quality dynamics where the companies felt that the only way to control the quality and bring down the cost was to bring the manufacturing in-house. These facilities are very costly and need to be feed, if they don’t get feed they cost money instead of generating it. Therefore, their organizations are very much sells orientated, meaning that they try to get an order out to the customer under the parameter that they set. It is quite dictated sell where they offer the customers to buy from a set menu to insure that the product come off the production line in the most efficient way. The difference with Envision is that they are not vertically integrated, instead they are linked in to their supply chain, which holds inventory and have a very efficient JIT (Just in Time) facility. That allows Envision to be more customer centric and have a dialog of what the customer want and need. The wind energy industry is very complex where most of the projects has some kind of tweak that the customers want in order to bring a better output due to topographics.

“So I can sit in front of customers and say. What menu do you want to eat from? And we can have a dialog around what do you actually want, and most of these customers are agitated that they are never get to buy from the menu they want.”

Coming out from China, Envision does not have the huge product- and service management offices their international competitor have. Which means that if the customers want to handle product- and service management themselves, like most do in China, it is not an issue. So
coming out from China, Envision can push the boundaries towards a more customer centric sell where the customer is more bespoke.

4.6 Envisions Future
The wind energy market is reaching new levels of maturity due to increasing competition among actors and the social drive to bring the cost of energy down. Due to the exponential curve of wind power technology, the hardware is about to reach its culmination of what is physical possible, see figure 9. The physical size of the turbine is starting to get to a point where it can be hard to push it further, due to the physical constrains of transportation and installation. The on-shore technology is already pushing the limits of what the public consider a reasonable scarifies for energy and loss of scenery, and other effect on their everyday life. Off-shore technology does not have the same constrains of size, but to transport and to lift such heavy equipment as a 10 MW turbine is very expensive and takes away a big piece of the economy from the turbine. So the game is changing from a more hardware innovative industry to a software orientated, in order to give customer tools to predict, monitor and maximize their asset conditions.

“I meet Chang Lay four years ago, and that was the first thing he said to me, the game is going to be about big data, big data analytics.”

Figure 9. Growth in turbine size and output (Busby, 2012).
Coming out from China, Envision have a portfolio with new value for the international market, which is entering a new phase. Between mid 2000s and the financial crisis in 2008, the wind energy market was a seller’s market, meaning that goods and shares where scares and sellers could keep the price high. After the crisis the customers became risk adverse, which was the beginning of the buyer’s market, where goods and shares became plentiful and buyers could buy for cheap. That period was enhanced by the increasing numbers of turbine manufacturers in the east and the global competition that started to emerge. Now the market starts to mature, the standards and customer requirements start to increase and put pressure on the whole industry. Those manufactures who cannot live up to the new need of the customer, will struggle for their survival.

“So I would argue that we really start to move into the shakedown phase right now. So now the market knows what it wants, now the players that can not deliver to those standards, wont survive.”

Companies therefore have started to merge with each other to stand strong for the future. Alstom Wind merged with GE in 2014, Nordex merged with Acciona in 2015, and Siemens now talk to Gamesa about merging their organizations together. The companies that will stay is the innovators, the companies that keep on bringing new technology and value for the customers, and challenge the price of energy.

“And the guys that will stay is the innovators, the guys that can bring something new to the party, and that is why we are bringing something new to the party, software development, whole lifecycle approach [...].”

Due to the increased maturity of the international wind power space the competitiveness will increase. It will therefore become harder to enter the international space as time goes. Meaning that companies that do not operate in the international space in the near further might not be able to establish themselves in the international space due to the increased competition following the increased market maturity. Envision which has built a strong organization in their home market and developed new innovative turbine and software solution and stands well equipped for entering the international space which now have entered a consolidation phase.
5. Analysis & Discussion
This chapter will combine theory and empirical findings presented in chapter 2 and 4 in order to analyze and answer the given research question presented in chapter 1.3. The analysis starts by identify Envisions business model in subchapter 5.1 with the help of the business model canvas. With the nine building blocks, four themes (Market position, Human resources, Supply chain and Market orientation) were identified as crucial for Envisions successful business model and are elaborated further. The analysis in subchapter 5.2 then analyze what general conditions and policies that drive the Chinese wind power manufactures to the international market and what barriers they have to overcome to establish themselves internationally, using the general advantages of being a Chinese wind turbine manufacture. In subchapter 5.3 a more case specific analysis of Envisions way into the international market is given, the barriers they have to overcome for a successful market entry and what competitive advantages they can build their market entry on. Together the three subchapters build an understanding of how Envisions has managed to build a unique organization with a competitive advantage towards their Chinese, but also international competitors in the international market.

5.1 Envision Business Model
The founder of Envision has a clear vision of pushing the energy technology forward and create, and contribute to a more sustainable future for the whole planet. The fact that Zhang Lei decided to start the energy revolution with wind energy can be explained by the wind power industry becoming the least-cost option for energy generation but also the big market opportunity given in the Chinese market. The vision of changing the world formed an innovative organization that in a protective market allowed them to build an enterprise preparing for the global market.

The business model canvas helps illustrate Envisions business model and reveals how the company conduct their business. It shows who the customers are, their value proposition and other components that is useful when analyzing and explaining the business model (Zott, et al., 2011; Osterwalder & Pigneur, 2009; Magretta, 2003; Teece, 2010). Envision has managed to design a unique innovative organization in a country known for their ability to imitate others. The background of the founder Zhang Lei, together with the industry specialist and the vision seems to have led the company into their own path. This can be seen as a first step towards their rapid growth and development since they have avoided the traps of imitation. Which can lead to a scale-downed version of others and have reversed effect in terms of profit (Baden-Fuller & Morgan, 2010; Magretta, 2012). With their own unique business model they stand strong for the future and will be able to sustain and protect the competitive advantages they have mangaged to build (Porter, 1996).

The vision of a more sustainable future drives the whole organization and not the next financial report. By listing and have dialog with their customers they can manage their innovation skills and develop and offer new value. The customer demand and knowledge is now higher, putting more pressure on the industry. It forces the manufactuerers to stay innovative and lower the cost of energy (Osterwalder & Pigneur, 2010). Envisions holistic business model with innovative hardware, software and life-cycle approach which lower the cost of energy in every aspect seems to fit well with the industry changes and will keep generating profits in more competitive market (Gibson & Jetter, 2014).

With the help from data presented in chapter 4, Empirical findings, and additional interview data an illustration of Envisions business model is presented in figure 10.
The presented business model canvas looks like an illustration of a western wind turbine manufacture and not Chinese. It includes world leading key partner, innovative activities performed by industry specialist, a holistic and comprehensive value proposition with international channels and relationships. The number of Chinese wind power suppliers suggest that Chinese wind turbine manufactures prefer to use domestic suppliers and even though the Chinese manufactures have had an upswing when it comes to innovation and the number of patents, the western technology still is more advanced. It can be related to the technical know how, wind power is relatively new in China and they are still catching up in terms of knowledge and experience. More and more Chinese companies have started to establish global innovation center to increase their operation, channels and customer relationships but they still have long road ahead compared to Envision, which included all these factors in the business model from establishment in 2007/2008.

From the empirical findings, four factors (market position, human resources, supply chain & customer orientation) has been identified with the help of the nine building blocks included in the business model canvas to explore and analyze Envisions business model (see figure 11). Empirical findings suggest that the four themes contain elements that make Envisions business model unique and are related to their rapid success in the wind energy market.
Figure 11. Four factors used when analyzing Envisions business model

Market Position

In late 2000 the Chinese market started to flourish and domestic and international manufactures started to realize the big market opportunity China possessed, and everyone wanted in. The Chinese manufacturers could offer a price that the international players could not match, but offered quality products that still could not be produced by the Chinese manufactures. This created customer segments with different wants and need, some wanted cheap from the domestic Chinese manufactures and others wanted quality from international manufactures. What Envision did was to combine the want from the two segments and offer a more qualitative product then their Chinese competitors and a cheaper product than their international competitions. This created a new customer segment that attracted customer who wanted more quality from the cheap, and customers from the quality segment who wanted more value for their money (Osterwalder & Pigneur, 2010).

“*What envision has managed to do, is to move the client to move along the buying motivation forwards a more quality product that works.***”

By operating in their own customer segment they could tend to their customers wants and needs, with domestic market knowledge and international technical capabilities. They managed to create innovative quality products that lived up to international standard but with a cost structure that still attracted their customers in the Chinese market. This shows that Envision knew who their more direct customers segment was, but also that they prepared themselves to reach the international customers segment when time was right (Baden-Fuller & Haefliger, 2013; Osterwalder & Pigneur, 2009). Their domestic origin and market knowledge has also been crucial in order to move the Chinese customers towards more expensive quality
product, and been key in the establishment of a well function customer relationships. Trough communication in native tongue and high technical experience Envision could build trust and a repetition of being a quality provider. As the market trend towards more reliable products, Envision grew and managed to build a customer loyalty and nurture their customer relationships.

“Rapidly the China customers stated to recognized that they didn’t want cheep products that didn’t fulfill their design criteria and what they were looking for. They want a quality product like anyone else because they need to generate electricity on an hourly basis, so they need it to work”

Human resources

Envision established themselves in the third stage of turbine innovation in China, which was characterized by cooperative innovation, collaborative design and joint venture. Driven by the desire to revolutionize the industry Zhang Lei recognized that he needed to attract sharp minds in the industry domestically and internationally and let them work together (Grisen, et al., 2010).

“But in fact that envision started in 2007 and the key to our success since 2007 is that Zhang Lei, recognized that he needed good talented people from the industry to take forward the technology that was as least on pile with the international standards.”

The decision to bring in these key resources was the start for Envision rapid growth and development. By bringing in specialists from different rivals, Envision bought the know-how of several technical solutions and have from there managed to combine the knowledge to a turbine solution which has been the base for further development. The turbine solution did not originate from imitation as many other Chinese turbine solutions did, that went trough the 2nd stage of Chinese wind turbine innovation. It is more related to stage 3 of cooperative innovation with collaborative design. By investing in human recourses and leapfrog stage 1 and 2, Envision did something unique, which aloud them to start the stage indigenous innovation and develop wind turbines of international standards close after their market entry.

“[....] rather than go through that long process of learning, his mindset was that I want quality leading product and I want it to be to the international standards.”

The human key resources are the foundation for the company’s key activities, which is technical innovation for a lower cost of energy and ultimately a more sustainable energy supply. The technical capabilities in the company have resulted in a new turbine solution that ensures maximum power generation and service life with the “smart turbine”. More compact turbine solutions for easier and cheaper transportation and assembly. The two bladed partial pitch off-shore design that reduces extreme loads with 30 % and require less material in the foundation, tower and turbine. Combined with their open interface overlay software system that fit any renewable energy source for easy monitoring and optimizing of the energy assets. It is no doubt that innovation is the key activity of Envision and that they will continue to challenge the current norm in the industry.

“And what is the key game changer in the industry is that our software can fit any assets, any renewable asset, not just wind assets, so wind, solar, hydro, bio mass and the software is developed so it can be overlaid on any assets including our competitors in the industry.”

The purpose of Envision is clear, to revolutionize the energy sector through technical innovation for a sustainable future, and with that purpose the opportunity to attract industry specialist appeared. These specialists are now working together with a shared goal of
revolutionize the energy industry. Thus, it can be seen that individuals are drawn into innovative organizations that offer opportunities to contribute to a purpose. This together with the opportunity to grow, exciting assignments and interesting careers has allowed Envision to attract their key resources and engage in the company’s key activities (Ready, et al., 2014). The experienced and well known industry specialist came to Envision with another valuable asset. Their industry network with suppliers, institutes, customers, distributors and governments. The network gave the company access to channels that allowed them to rapidly build an organization with a desirable supply chain and customer reach.

Supply Chain

In a market were most customer wanted cheap products Envision with there high quality approach with proven technology had to find solution to streamline their cost structure. By leverage the fact that they were operating in a cost-driven market they could take cost-saving actions in their supply chain that did not interfere with their quality and value-driven approach. The use of domestic suppliers and contractors played a big role when competing with international manufactures in china, and thanks to the competitive advantage these key partnerships gave, they managed to gain market shares.

“Second initiative is changing the model in China, bringing in a high quality product, but still leverage in the supply chain in china to maintain a cost base that the customers would still purchase in China. But recognize it as quality product because it proven technology.”

The use of proven technology and international world leading suppliers is the core in Envisions turbines. By establishing key partnerships with Winergy, Siemens, ABB, SKF, LM and other quality providers Envision reduces the risk of turbine failure and in the same time keep up to date with the latest technology, since big companies often rely on being innovative and push the technology boundaries forward. Other benefits of using world leading quality suppliers is that they can meet a change in supply demand and rate their customer satisfaction high. Which means quick response time when technical issues emerge. In any producing or generating industry technical failure means a lose of revenue and need to be dealt with immediately.

“So that’s the other part of our success, so high quality, proven technology, proven supply chain, and that accelerator envision in terms of the success in China.”

Customer Orientation

From a customer perspective, everything revolves about the cost of energy. Therefore, the best technical solution does not necessary mean the best overall solution. The lifetime and the ability to service and maintenance the turbine is also of high importance. As is the ability to customize the turbine design for a maximized electricity output. There is no doubt all manufactures in the industry know this, question is how to offer a value proposition that meet the customer demand and in the same time make a sufficient profit. Envision seem to work the customer demand from all angles with innovative turbines designs that maximize the electricity output with a supporting software that prolong the lifetime and optimize the asset efficiency. They also aim to leverage the benefits of being a young organization in a very vertically integrated industry by letting the customer be more bespoke. By having a dialog and be more customer oriented of what the customer really wants Envision will strengthen their customer relationships but also increase their value proposition.

“So I can sit in front of customers and say. What menu do you want to eat from? And we can have a dialog around what do you actually want, and most of these customers are agitated that they are never get to buy from the menu they want.”
Added value also raises the customer’s willingness to pay. In the wind industry the hardware piece is the largest revenue stream but as the importance of the optimization and life cycle increases due to limitations in turbine size. The software, service and maintenance will play a larger role in the industry as revenue stream. Envisions decision to build an energy internet with their overlay software give them a competitive advantage. Customer that own wind turbines from different manufactures, using plural software systems to monitor their assets can improve and boost their operations by switching to Envisions software. The barrier for customers who have tried to keep their operations simple by staying loyal to few brands disappear with the software and puts pressure on the competitors to keep their customers. The software sales will in the same time allow Envision to build customer relations with new potential customers to their hardware.

“[….] knowing Envision without actually buying any hardware. They got our software on their assets so it seems that we are solution provider. Which helps us again build this level of trust, for the guys that are risk adverse.

The four themes together captured the most vital elements in Envisions business model and gives and understanding of their young but well planned organization. The have chosen to place themselves in the market where no one else has, they have as the first Chinese wind power company chosen to requite in the know-how, emphasized on quality suppliers instead of cheaper domestic ones, and put the customer and the cost of energy in focus as a part of their value proposition in ways the vertically integrated competitors cannot.

5.2 General for Chinese manufactures entering the international market
The Chinese market conditions for wind turbine manufactures are changing. What used to be a very protective market for the domestic manufacturers is now transforming into a more open market place where international players are allowed to compete on more equal terms. This raises the competition level and put pressure on Chinese company’s business strategy and innovative skill. The wind turbine manufactures that exclusively try to meet the international competition with expensive and time-consuming product and process innovation will most likely face more difficulties than those who combine the innovation effort with business model innovation (Osterwalder, Pigneur & Tucci, 2005; Amit & Zott, 2012).

Most international player have big finical muscle, business model innovation could therefore be a more cost-effective and sustainable way to maintain or improve profit margins (Amit & Zott, 2012). Especially in modern times when the process for technical imitation is short and ineffective (McGrath, 2011). As a result of the increased competitiveness in the domestic market, Chinese manufactures will now experience more limited growth potential inside Chinese borders. In the same time Chinese manufactures know have technology and organization stable enough to move into the international space and ensure continued market growth. It is common cooperate strategy and response to changes in internal and external factors and an increasing numbers of Chinese manufactures has already established international innovation centers (Grisen, 2010; Koch & Meckl, 2014).

The Chinese wind turbine policy has been the driving force for the development of the Chinese company’s technical capabilities but also the huge market needs. It is also the underlying force behind the more competitive condition in the domestic market, with the intention to create a more open market environment and encourage domestic companies to trigger an internationalization phase (Lambert & Davidson, 2013). The policy changes act as a driver for all Chinese wind power companies to initiate an internationalization is the and it is
plausible that Chinese policy will continue to support their domestic companies in the international space (Zhang, 2012).

“[...] that is why the RMB (China currency) is so strong, so that dynamic is key but what we are seeing right now is that the China government is recognizing this, China is slowing down because their exports is one the threat of this strong cost fiscal policy that they have, so they are going to devaluate, which will bring us back able to support our customers from a hardware point of view.”

The Chinese wind power policy has managed close the technology gap towards western competition and are now about to create a new important export industry for the country. Housing five of the ten most successful manufactures in 2015 and a third of the world’s total cumulative wind power effect, China and their manufactures is entering the international battle of the wind energy industry in an accelerated manner (Tan & Mathews, 2014). An organizational change will in most cases be necessary to be able to operate internationally, as will a redesign of the Chinese company’s business model to better meet international requirements (Lambert & Davidson, 2013).

There are different paths to take when entering the international space, as e.g. the western companies Vestas, Siemens and Enercon has shown with a generic and broad approach, or target a certain customer segments as Siemens have down in the off-shore market, or keep on focusing on the home and neighboring markets as Enercon has down in Germany. China have organization who is less or more equipped to enter the international space. Some will have to enter the space bit by bit as they build up their ability and understanding to do so. (Johansson & Vahlne, 1977; Ying, et al., 2013). Others have the muscle to move quickly when the timing is right, and some has even been aiming on the international market since their establishment.

“[...] to influence the energy industry we need to be an international player, so that is the drive why we internationalizing the organization.”

The internationalization and search for new market shares as already began (Zhang, et al., 2015). Some has been more successful then other when entering the international space, but by analyzing international company’s entry into China and learn from each other, the Chinese companies will most likely find ways to penetrate the international market. There is many lessons to learn about how to adjust the value proposition when entering a new market. The demand in the international market is not the same as in the Chinese market, something Goldwind experienced in their market entry.

“We have been very strong and been able to respond in the market in china, we are now building an organization to be as strong to respond on the international market. [...] Vestas and others hit the barrier of entry into china because they didn’t have product fit. [...] We have seen some key learning of what they (Goldwind) have tried to do, because it is a distinct different market place then china and they have made some fundamental errors”

One advantage most Chinese companies have, is that they are not very vertical integrated, and most western companies are. This is routed in the vertical integrated organizations which was build due to technical difficulties and quality dynamics. Moving manufacturing in-house and develop standardized solutions, the manufactures managed to streamline their cost structure. That took its toll on the customers that became less bespoke and boxed in to work under the set conditions. So by leveraging their non vertical organizations Chinese turbine manufactures can create a competitive advantage that turn their late comer status into a benefit together with ability to develop capabilities and strategies (Mathews, 2002; Bonagli, et al., 2007). This will put pressure on the established turbine manufactures to initiate business model changes to
better meet the new competition, those who not take precautionary actions early can find themselves in difficulties in the further, unable to recapture lost market shares (Teece, 2010).

“So they very much sells orientated, that’s my point. Meaning when sitting in front of a customer they are trying to get an order out to that customer under the parameters that they set, so they are almost forcing the customer to buy from a set menu. And as an example they have large product management functions, large service functions, and also going back to the product a set process to insure that product come off the production line in the most efficient way. So it is a quite dictated sell.”

This locked and dictated sell from western manufactures is something most Chinese turbine manufactures can use to attract customers in their market entry. All Chinese manufactures will however, face difficulties when establishing themselves outside China, and especially in western countries which still think Chinese products are linked to cheap and bad quality products. The Chinese hypotheses is big barrier of entry which the Chinese manufactures has to find ways to overcome. Another barrier of entry is the uncertainty connected to sales and operations. Chinese manufactures has had limited sales and operation outside China, and that lack of experience is not thought of lightly by developers handling million dollar projects. To overcome these main barriers the Chinese wind turbine manufactures have three internationalization modes: (1) Direct export, (2) Bring Chinese investors and (3) Own investment holdings (Zhang, et al., 2015).

“The way I describe one of our barriers is the pure hypotheses of china, from the western world. So cheap product, lack of understanding, fix it later on if we fix at all, and cheap.”

Export mode (1) will most likely be an ineffective way to penetrate the international market, considering the risk adverseness from international banks and developers. Wind turbines are a long-term investments of millions of dollars, where a successful investment gives a low sustainable cost of energy and an unsuccessful one the opposite. With high stakes, the willingness to take risk decrease, so the biggest issue for all Chinese manufactures therefore is how they will show their worth and their technology as reliable.

“We can be a game changer to the current norm, but our problem is because of this risk adverseness we are unknown, we are not proven as far as international banks, finance and developers are concerned.”

Export mode (2) and (3) are not a sustainable solution to make international business, but excellent tools to show the banks and developers that they have what it takes to compete with already established companies in the international market. Depending on how good customer relationships companies have, and the finical muscle of these contacts, export mode (2) can give companies different spread and degree of market presence. The market presence together with successful development and operations will attract international investors. It therefore could be beneficial to target certain market but due to uncertainty of market conditions it can also backfire and leave companies stranded in stagnating markets. Export mode (3) where manufactures make use of their own bankroll will open up a new revenue stream and in the same time give them international market presence where they can show international investor their technology and operation, and how to best optimize their wind assets. The downside is that it diminishes the company’s finical status and movability to respond to market changes with technical and strategic plays. To maximize the result and minimize the cons, the manufactures should use the export modes in a combined effort in high opportunity markets to become proven on the internationally and find local investor as quickly as possible and include export mode (1) in the mix.
5.3 Envision in the international market

It is debatable if Envision is a born global organization or not. Even though they are considered a Chinese company, they have since their inception developed their wind turbine technology in Denmark, their software in US and their JIT capabilities in Japan (Ready, et al., 2014). They have also utilized international channels and customer relationships in their supply chain and managed to create competitive advantage against domestic and international competitors in the Chinese market by incorporate it all into their business model (Teece, 2010). So according to (Oviatt & McDougall, 1994) definition of a born global they qualify on use of multinational recourses but not on the sales output. But according to (Weerawardena, et al., 2007) sales is not a requirement to be considered a born global, it is enough to leverage a global supply chain with global suppliers and human recourses in the initial stage of the establishment. Born global or not, Envision have been conducting global R&D operation with international human resources and made use of global suppliers earlier than most other Chinese companies in the initial stage (Matzler, et al., 2013).

The international presence has been a successful business model strategy by Zhang Lei which have given Envision a sustainable period of growth (Sosna, et al., 2010). It is arguable how much Zhang Lei’s background as an energy trader in London has had for the Envisions success story. But fact is that he has down several things no other Chinese manufactures has down, (1) he sourced international human recourses, (2) established international office in the heart of each technology and competence center early, (3) focused on quality and product development for the global market and (4) applied a system integrated life-cycle approach with innovative software (Leih, et al., 2015). Each and one of these four things have contributed to envisions rapid growth and development, but the way they have been used together has made the real difference.

The souring of human resources enabled Envision to gather special expertise about global wind power technologies, regulations and business models, but also gave access to each individual’s network with institutes, suppliers and customers. Most of these experts was already gathered in geographical areas, wind technology experts around Denmark, software expert in Silicon Valley and JIT manufacturing in Japan. Rather than recruit and pull the human resources out of these centers of development, Zhang Lei established facilities to stay. Taking the nurturing of key human resources one step further, Envision only state preferred work location in their recruitment process, exceptional candidates are given the opportunity to negotiate their work location (Ziprecruiter, 2016). That gave the advantage of sourcing more of the best, since a move to China probably wouldn’t attract senior expert with families.

“[....] in fact at GIC (global innovation center) we got around 40 grey haired industry specialist over there from different areas, [....].”

The human resources at Envision is key for the whole organization which other competitive advantages are built on. The international offices would not have been possible in such an early stage if not for the “grey haired” human resources with expert knowledge. Neither would the company’s technical innovation or quality focus been with the lack in know-how and network of suppliers. The capabilities of system integration would not have been the same and the open overlay system could have been a challenge beyond their reach without them. Given the fact that Zhang Lei could view the Chinese wind turbine industry from outside China during is time in Europe, he might have picked up on signs of strengths and weakness in the typical China business model. By then combining the strengths of the typical China model with typical international model, Envision was formed (Osterwalder & Pigneur, 2010) and then further developed with the industry experts in a open business climate (Chesbrough, 2010) united by Zhang Lei’s vision and leadership (Leih, et al., 2015).
In Envision’s recently started internationalization phase, the establishment of international offices can be leveraged and used to convince the international developers that they are not a Chinese organization, they are a multinational enterprise with head office in China. Describing the organization to a customer, an Envision sales person can wash off a big part of the China stamp and the Chinese hypotheses, but still point at the benefits of being one of the top players in the strongest wind power markets in the world. One competitive advantage that Envision can use is that they are a Chinese wind power company, which is not vertically integrated. Not having the huge facilities with standardized solution gives Envision the opportunity to be more bespoke and increase their value proposition towards customers who want more options than the ones given by the international manufacturers set menus.

“So I can sit in front of customers and say. What menu do you want to eat from? And we can have a dialog around what do you actually want, and most of these customers are agitated that they are never get to buy from the menu they want.”

By actively integrate the customers more in their product, operation and service offering, the value for the customer increases at Envision. It also put pressure on Envision to build a western project and manufacturing organization that can supply the more bespoke offer, and the Hamburg construction might be considered like the next generations project management office from where the customer will be in focus. Other Chinese competitors has can also use the fact that they are not vertically integrated to the same extent, but they have turbine solutions from Chinese suppliers, which does not have the same quality as the big international suppliers Envision uses. Beside the quality issue they will also phase logistic issues, issues that Envision will not have to the same extent. Envision suppliers are already present in the big wind power markets. So in contrary, the internationalization for Envision brings logistic benefits compared to the current operations in China. Another competitive advantage compared with the Chinese manufactures is Envision’s market knowledge. Competitors has shown with their failed attempt to establish themselves in the international market that it is important to understand that it is a different market with other customers needs and market conditions. The industry expertise at Envision has been working in the international space, knows the conditions, what the customer want and need, they even know their competitor strengths and weaknesses. The knowledge gained with international human resources working in the international space give Envision a huge advantage when it comes to establish sales revenue internationally.

When the Chinese wind power industry were focused on turbine development in 2007/2008, Envision was established. The international manufactures were ahead with the turbine development and had started to raise the question of service and maintenance. How to optimize the wind turbines and prolong the lifetime in a life-cycle approach. At this time, Envision had to come up with a wind turbine solution of their own. They combined knowledge of the industry expert came up with a turbine solution of available components and system integrated them, the know-how of several turbine solutions merged into one. Here the human resources network with supplier gave them a unique opportunity to build a quality turbine with quality components of the most respected suppliers in the industry but also to assemble them in China, which kept costs down. But not only was Envision working on their turbine solution, they as the rest of international players understood the importance of the service and maintenance, the life-cycle and the cost energy (Waldner, et al., 2015).

“So our designs are an evolution of what product is available and how can we system integrate that product.”

The international players began to put more energy into their software development that could monitor their selection of wind assets. It all started to be about more than just hardware, and
increased the value towards the customers. But it came with the certain restrains, the customers had to operate several programs to monitor their wind assets if they were from different manufactures. The software was also developed with a one fit all approach, even though the customers where operating wind assets in different geographical areas with various conditions. The software was without doubt an improvement, a tool which made the customers operations easier, but it could still be taken to the next level.

With a clean sheet, but awareness of current software issues, Envision could start sketch on their own software solution. Again human resources are thought to have played a key role in Envisons capabilities to take system approach to the turbine, but also to other aspects as manufacturing, transportation, service and optimization. Industry specialist from Vestas, Siemens, Gamesa, GE and many other top manufactures with knowledge of their former company’s software solution and the best tech guys in the world in Silicon Valley, gave Envision the tools to create their open overlay system which can fit any renewable energy assets, not just wind. It is a cost effective tool for organizations who operate renewable energy assets to streamline their cost structure and raise the effectiveness of their operations. The open software which allow customers to develop their own customized platform suitable for their specific needs brings extra value, now when the preparations for the international space is over and their internationalization has begun.

In 2014, Envision entered Chile with a 10 MW project through local investor, and in 2015 they acquired a 25 MW project in Sweden, and a majority stake in a 600 MW project in Mexico (Windpowermonthly, 2014; Cleantechnica, 2015). With the three projects, Envision has entered European and the North and South American market. It is part of their generic and risk adverse internationalization strategy where they establish themselves where there are big market opportunities. The projects help Envision to break down the barrier of entry and demonstrate that they have an organization capable to conduct business in the international space.

“So we are quite generic in our approach into the international business, we have clear goal of what we want to achieve but breaking that down into absolute market numbers we don’t do that right now at envision. It is to risky.”

The generic internationalizing phase is a natural step towards realizing the vision of transforming the global energy sector and to ensure continued growth. By entering different markets Envision divide the risk between markets and in the same time increase their chances of making an impact on the global energy sector. It is also a natural process for the global organization they have managed to build. To enter the international market only seven years after establishment is considered rare in the wind turbine industry, maybe even rare enough to qualify as accelerated internationalization according to (Shrader, et al., 2000) and more defiantly according to (Tan & Mathews, 2014). To enter three continents in two years is a huge achievement which lay the foundation for a more accelerated internationalization in the near future. In fact, Envision has just penetrated the markets and made use of two out three export modes. That means that they still have one more gear to accelerate their market entry and show the local banks and developers that they have came with proven technology as a serious competitive actor to the current investment options (Weerawardena, et al., 2007).

Envision brings new innovative turbine, software and ways of business into the international market, which puts pressure on the already established actors to review their business models, to meet the new competition (Sosna, et al., 2010). The software and use of IoT is one of Envisions biggest competitive advantage since that gives them a fourth way to show international investor that they are a reliable solution provider in the energy sector. It will connect them directly to customer segments operating with renewable energy sources, and the
IoT will provide data analytics which will be valuable source in the rising service and maintenance segment within wind power industry (Liu, Danilovic, Hoveskog & Halila, 2013; Pataci, et al., 2015)

“I meet Zhang Lei four years ago, and that was the first thing he said to me, the game is going to be about big data, big data analytics.”

Zhang Lei seem to been early in his understanding of the impact the IoT could have for the energy sector, and chose to build and implement it in the business early. With expertise from Silicon Valley Envision act as first mover in the wind power industry with the open overlay system, and by entering new markets through export mode (3) Envision has the possibility to show the whole holistic package of their value offering with software which can be customized to optimize wind assets performance depending on internal and external conditions. It is an effective way to marketing themselves as a brand, hardware and software provider while generating profits from electricity distribution.

As earlier mention, Zhang Lei saw the wind energy industry as a catalyst to realize his vision of changing the whole energy industry throw technical innovation (Osterwalder & Pigneur, 2010). What that really implies is that the vision was the main driver to go international and wind power were not meant to be the core in Envisions business model forever. It is plausible to believe that Envision will start a transitioning in business focus towards becoming more of a software and service provider.

The open overlay software which can be applied on any renewable energy asset, has the capability to optimize performance and asset-life, and truly revolutionize the entire energy industry. That mean that Envision has been working towards a long-term goal since their establishment and that their business model was designed to change over time (Osterwalder & Pigneur, 2010; Grisen, et al., 2010). It is therefore likely that Envision will become more and more recognized as the energy solution provider which they aim to be, as they are about to start a new chapter in energy management with their software solutions.

“And the hardware is not the sexy piece now, it is the holistic view”.

The holistic energy package that Envision now can offer brings credibility to them as an energy solution provider. Further, the timing of Envision internationalization can be related to the change of the industry dynamics between wind power manufactures (Pataci, et al., 2015) and the new levels of market maturity in the western world, which has initiated a shake down phase were companies has started to join forces to stand stronger for the future. As the companies who already operates in the international market join forces, it will become harder for emerging outsiders to establish themselves internationally, due to the increased competition level. Further the competitive level will be reinforced as Chinese wind power policy encourage Chinese wind turbine manufactures to go international.

“So I would argue that we really start to move into the shakedown phase right now. So now the market knows what it wants, now the players that can not deliver to those standards, wont survive.”

The change in industry and market dynamics can have forced Envision to initiate their internationalization earlier than planned to not miss the window of opportunity to establish themselves on the international market. That would make the international external environment one of the drivers for Envisions internationalization (Grisen, et al., 2010; Lambert & Davidson, 2013). This is speculations of a plausible scenario. Their internationalization can also have been planned since long and executed with impeccable timing as an own initiative to business model change (Teece, 2010). Nevertheless, Envision
always aimed to enter the international market with their global organization, so they could make an impact on the energy sector, making their internationalization a matter of time.
6. Conclusions
The vision to revolutionize and transform the energy industry has been the driving force for Envision’s business model, which holds many unique components. A main factor for their successful business model is that Zhang Lei, with his international experience, recognized that he needed good talented people as he formed the organization. The human resources at Envision are the key for the whole organization and the competitive advantage they have managed to create. The sourcing of these human resources enabled Envision as an organization to gather special expertise about the global wind power technology, markets and ways of business. It also gave access to each individual’s network with institutes, suppliers and customers, which has made Envision’s business model possible. The sourcing of international industry experts from competitors is in many ways unorthodox and unique for a Chinese wind turbine manufacturer. To further offer exceptional candidates the opportunity of teleworking is proof of how important the human resources are to the organization and makes it clear that they are the key resource of Envision, and one of the core elements in their business model.

The sourcing of human resources has also been key to Envision’s establishment of a global organization, with international offices in the heart of technology and competence centrums close after their foundation. The international presence is another important key resource, allowing Envision to be up to date on the latest technology, which is necessary with their focus on developing innovative energy solutions. The international presence gives Envision enhanced credibility as a quality provider, which can be leveraged and used to convince international developers that they are not a Chinese organization, with Chinese technology, they are an international organization with high quality products. Describing the organization to a customer, Envision can avoid being associated with the Chinese hypotheses of bad quality to a low price, but still point at the benefits coming out from China as one of the top manufacturers in the strongest wind power market in the world. A big part of their internationalization is to brand themselves as multinational company with international product and quality offerings. By taking a holistic approach with system integration in their research and development, manufacturing, project management, development of effective procedures for service and optimization, Envision have erased many connections with other Chinese manufactures and can be regarded more as an international brand with a international business model, with global operations.

In China, Envision were sheltered from international competition and operating in a fast growing market with little regard towards quality. With the aim to grow and become a global energy solution provider, they develop a business model that filed a void in the domestic market by emphasizing on quality and innovative solutions. With the industry knowledge and network of suppliers, the international human resources working in the hearts technology and competence centrums played an important role in the key activity of qualitative product development. With the combined knowledge the human resources could put together available technology and then system integrate it into new turbine design, using well known and reliable suppliers. Emphasizing on quality Envision became one of the largest players in the Chinese market and in the same time erased the biggest barrier of entry into the international market.

The cost of energy is driving the technology development at Envision, making them take a system integrated life cycle approach towards energy generation. The two bladed offshore turbine can be used as an example. The two piece divided partial pitch design reduces material in the manufacturing, simplifies and lower the cost of transportation, shorten the assembly time on-site, increase the serviceability and have the ability to reduce extreme loads,
opening up for less material in the foundation, adding up to a lower cost of energy. Monitoring an optimization software is another way to lower the cost of energy. Envisions cloud based open overlay system which can be used on any renewable energy source and can enhance asset life and performance by handling the whole life cycle from post-construction assessment, service and maintenance to asset optimization. Envision act as first mover with their cloud based open overlay software system, which has the potential to be a game changer and start a new chapter for Envision as a software and service provider for the entire renewable sector, in a more system integrated approach for the global energy internet. The software brings many benefits to the customers and thereby increase Envisions value proposition, but as any new product, it is crucial that the new cloud based solution is accepted by the customers. Envision decision to take in the best of the best in the development stage from Silicon Valley, to develop a user-friendly system with presumable top modern cloud security increase their chances to get it accepted by the market. If for example, the cloud security was developed in China, many customers would probably not even consider change to Envision software, but the fact that it is developed in the center of cloud-based solution gives the cloud security credibility. A more user-friendly software and in many cases higher security then their current data security system will be appealing for many to make the transition.

It is the vision to revolutionize the energy sector that is the main driver for Envisions internationalization. External drivers as policy changes in their domestic market and the increased consolidation in the international can have had an affect on their timing, but the aim was set on the international market from their inception by their vision. Regarding the vision, the new open overlay software is likely to become the new heart in Envisions business model. Because as a wind turbine manufacture they cannot transform and modernize the energy sector, but as an open overlay software provider they have the capacity to do so with the help from big data. By collecting wind, solar and other renewable data, Envision could become the energy sectors Google. Data analytics could optimize more then just current operation, it can change the conditions for the worlds renewables manufactures, by increasing the understanding of how different parameters affect the energy output. Meaning that Envision software and collected data with the help of data analytics can increase current research and development activities, manufacturing procedures, project management and service of renewable assets, and increase the energy output and lower the cost of energy. Depending on market success or fail for the software, the core in Envisions business model can change in the near future.

It is plausible that competitors are not very fond over the idea that a wind industry competitor will gain knowledge over their wind assets by collecting big data. But how will Envision use this data, will they use for their own gain and use it a competitive advantage, or share and provide it to their competitors for a fee so further technology development can flourish? The big data from renewables has business potential beyond reach of Envision current turbine manufacturing, and the power to truly revolutionize the energy sector. It could mean an upswing for all renewable energy sources and a change in respective industry dynamics when a Chinese company holds the power to further development. In the wind power industry, Chinese companies are young and does not have the same know-how as the western companies do. Could that change with Envisions new software and collection of big data, will the data even out the odds when it comes to technology development and operations and affect the industry dynamics?
7. Implication of Envision as case study

Envision managed to build a global organization by recruiting top talents that where operating in the heart of technology development of different fields e.g. wind technology in Denmark, software technology in Silicon Valley and integrate their knowledge into their business model. Other Chinese competitors that which to establish themselves internationally, should learn from Envision and how they managed to attract top talents build a knowledge network that contribute to the holistic value proposition. Because with the top talents Envision got the know-how, supplier and customer relationships, market knowledge and many other important factors that they have built their technology success.

Chinese companies that already have established international offices should explore how they can use their international presence more and implement the international knowledge into their business models. Chinese companies that wish to recruit top talents should see to how they could make themselves appealing and use that to establish international offices to come closer to the international market and raise their understanding of the market and in the same time enhance their know-how and innovative capabilities. Envision managed to attract their top talents by offering the opportunity of teleworking, indigenous innovative support, holistic approach to energy, uniting vision. There is still a lot of top talents that are waiting for the offer that make them tick, could be money, management positions or other factors that make them want to change workplace and join the upcoming Chinese organizations.

By focusing on quality and technical innovation, Envision differ from other Chinese turbine manufactures and can easier overcome the preconception of the China hypotheses and brand themselves as an international quality energy solution provider. Chinese companies that has not put the same effort into quality can not compete with quality, they should therefore stick to what they know and try to compete with price and good enough quality. The industry has matured and today’s good enough was considered high quality not a long time ago. As the maturity of the three bladed wind turbine design keeps reaching its peak, a more balanced quality standard will emerge between the western and Chinese companies, giving the Chinese companies a competitive advantage on price.

Envisions with its quality product is aiming on the established wind power markets of Europe and North America, also entering South America. With a generic internationalization process, they brand themselves in three continents and in the same time minimize risk by going where the big market opportunities emerge. Other Chinese companies with less quality focus and cheaper products would face barrier of entry in these regions because of the Chinese hypotheses. According to (Campell, et al., 2014) wind power companies from emerging economies have business models that are generally more accepted in emerging economies then the western ones. With that in consideration, and the fact that Envision with its international business model still have problem to convince investor in the European and American market, Chinese companies should focus their internationalization on other emerging economies.

The new software solution shows that Envision truly thought about the holistic picture, combining different renewable energy sources from different manufactures in one program. The software, big data and big data analytics have the power to realize Envisions vision and change the conditions for the renewable energy companies. The software can become an important tool for the wind turbine manufactures and operators, and by jumping on the train in the early stages with big data analytics companies do not risk oversee what can be the next big thing in the industry.
8. Recommendation for Envision

The one big issue Envision faces internationally is the fact that they are operating in a knowledge intensive industry where investor get risk adverse by just hearing the word China, because the general understanding and hypotheses of China is that it stands for cheap and bad quality. To eliminate the same issue for the new Software program, a recommendation would be to found a second company with head office in a more internationally accepted country and under another name. A head office in Silicon Valley where the software is developed without direct strings to the shanghai office in China could eliminate issues connected with the Chinese background and heritage, and boost the business.

As a wind turbine manufacture from an emerging economy, research suggest that Envision could be more accepted in other emerging economies, such as Middle East, Africa and South America. In a generic internationalization strategy, it could be wise to separate the emerging and established markets as the conditions and customer approach differ from each other. The interviewee (head of business development) for this thesis has a responsibility of Europe, Middle East and Africa. A suggestion would be to e.g. divide that position into two positions, one for Europe and one for Middle East and Africa. This would enable Envision to be more focused on the given regions customer want and need, and tackle the different barriers of entry into the given markets.
Future Research

The changes in industry dynamics and the international market maturity is an interesting topic to take further. How will the consolidation of international wind power manufactures affect the wind power industry, market and innovation?

The human resources have been the key for Envisions rapid establishment and success in the wind power industry. One suggestion for further research is to explore and compare how wind power companies are nurturing and utilizing their top talents.

The three bladed wind turbine design seems to have reached the maturity phase of the s-curve and it is therefore plausible that other wind turbine designs will emerge to further lower the cost of energy. To explore and analyze what implications a new dominant design has had in others markets would be of interest of wind power companies and research in industrial management.

Further research about Envision and their organization is of interest to increase the understanding of their software and the impact it can have on the energy sector. One interesting angel could be to compare Envision with Google and explore the possibilities of big data collected by their open overlay system for renewable energy assets.
References


wind-energy-projects-mexico/ [Accessed 01 05 2016].


Pataci, H. et al., 2015. *Exploring the dynamics of the wind power industry*. s.l., Centre of Innovation, Entrepreneurship and Learning Research (CIEL), Halmstad University, Halmstad, Sweden, (2) Shanghai Dianji University, School of Business, Shanghai, China , pp. 1-19.


Appendix 1 – Interview Guide

Purpose with the interview

Is to identify what lies behind Envisions rapid growth and success. Seek and explore how Envision has managed to become one of the top wind turbine manufactures in the world, able to compete with the more established enterprises in the industry.

Interview Guide

Introduction, present the layout of the interview, my thesis which is about business model innovation in the wind energy industry. The end goal is to acquire a better understanding of Envisions rapid success and their business model. If the participant does not understand the question, I will rephrase question and guide the participant to answer the question within the theme of the question. The interview will be recorded (with participant consent) and held in English.

General Questions

- Mr. Childs, can you please tell me a little bit of yourself and the path you have taken to reach the position you have to day?
  - Education & Work experience?
- Can you please tell me a little bit of your current position and what you do?

History

- Can you please tell me about Envisions history?
- How was Envision established in the first place and why did Envision chose the wind power industry?
- Where did the technology come from and how has it evolved?
- How did Envision chose their technology solutions?
- Would you say that Envision is a successful company? Why?
- How would you explain Envisions success?
- Can you please tell me more about Envisions internationalization?
- Where have Envision located their R&D facilities?
  - Why a R&D facility in Denmark?
- Can you tell me about the wind park Envision is building in Sweden?
  - Background, considerations to the low energy price in Sweden, strategy underlying the expansion to Sweden?
- Some international agencies say that the Western wind power market is getting mature, what is your thoughts on current and future situation?

Product and Services

- Can you please describe Envisions portfolio of products and services?
- Can you estimate the amount of outsourcing of different systems? How much do you do in-house and how much is supplier related? What is the reasons for this structure?
- Where is Envisions manufacturing facilities located? Why those places?
• How does Envision work with product and service development?
• How is Envision working to find new markets and customers?
• What makes customer choose Envision?
• What does Envision make money on? What units is less or more profitable?
• Where would you say the biggest potential to increase the profit could be found?

Strategy

• What is Envision short-term and long-term goal?
• How is Envision working to achieve those goals?
• Can you tell me about Envisions international collaboration? What is the reasons behind these collaboration? How where the initiated and how has they developed?
• What did Envision do in order to enter the European market?
• Can you describe what value Envision offer their customers?
• How would you describe Envision competitive advantage?
• How is Envision working to protect or strengthen that competitive advantage?

Business model

• How would you define a business model?
• Can you please describe Envisions Business model?
• What have inspired Envisions Business Model?
• What importance has the Business model had for Envision?
• How does Envision emphasize the life cycle perspective in the business model?
• Who are Envisions major competitors and how would you compare Envisions business model to these competitors?
• How has the business model for Envision evolved over time?
• Has the business model changed in the internationalization process? What changes can you relate to the internationalization process?

Future

• How do you think the wind power industry is going to evolve in the future?
• What do think about Envisions position and development in this scenario?
• How do you think Envision business model will look in the future?
Can you please give me your own interpretation of this graph? What does it describe and what can you tell from it?
Why do you think this is happening?
What would you say is the cause behind the fact that the major companies are losing market shares to new entrants?
How do you think this graph will look in the future?
Bachelor in Energy Engineering