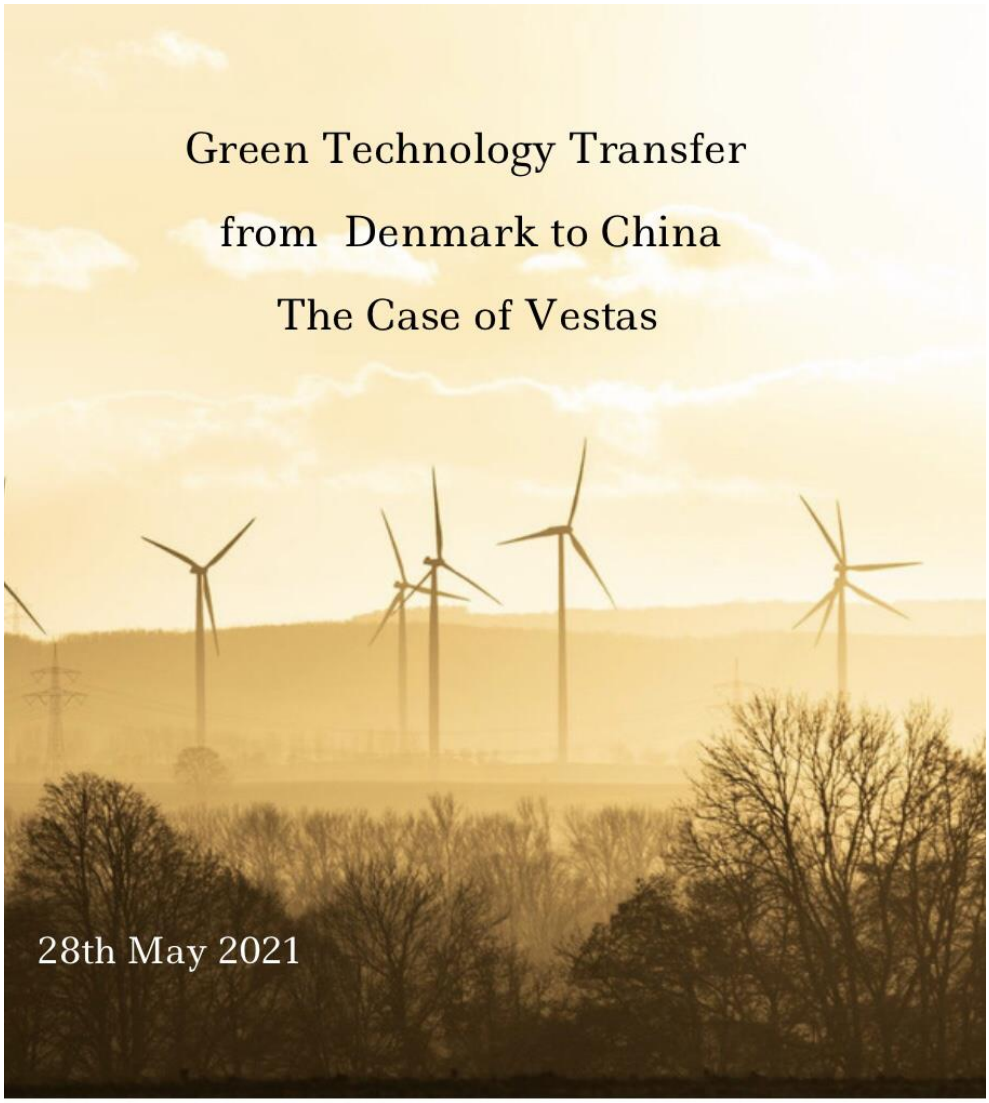

Green Technology Transfer from Denmark to China

The Case of Vestas

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Abstract

Green technology has recently become an essential part of sustainable development projects in developed countries. Furthermore, green technology solutions can bring numerous benefits when utilised in innovative facilities. The purpose of this dissertation is to investigate the diffusion of green technology in China and identify the challenges of green technology accumulation in the Chinese market segments. This thesis utilizes a comprehensive review of various literature to describe the dynamics of green technology transfer. Also, the standpoint of this academic work is to give an insight into sustainable green technology export and accumulation issues which are pivotal in bringing a more sustainable future, and the opportunities of improved energy efficiency. In the wake of the 21st century, most attention is shifting towards a sustainable future, and sustainable green technology is the key to achieving sustainable goals.

China's economic boom has also transformed the global economy in numerous manufacturing industries. This academic work investigates whether China's transformative policies extend to the new green technology innovation. This thesis also describes the rapid growth of the Chinese market which has a major impact on competitive forces in the global wind power industry. Whereas many Western companies have found opportunities of expanding their business in the growth of the Chinese market, the government's regulations and local legislation still give a precedence over Chinese wind power companies. In this manner, while the influence of the Chinese market and production power is already taking place, other influences are beginning to be felt, arising from fierce competition as new and

innovative Chinese companies start to emerge which poses a challenge to Western wind energy companies.

The case study of this thesis is Vestas System A/S which will shed a light on the ambition to create a more sustainable future through export and accumulation of green technology solutions to developing countries. This academic work will also investigate the company's aim to expand its services to China, which has already taken initiatives to tackle climate change issues. Furthermore, this research will investigate what facilitates or burdens the implementation process in China and how does the Danish government support Vestas System A/S in the export of green technology. In fact, international transfer of environmental technologies is considered an integral requirement within the framework of future sustainable development. It is assumed that export of green technology gives a desired means for technology accumulation due to its flexibility. Nevertheless, the export of environmental technologies is suppressed by strict government regulations, in particular, the Chinese government regulations. Using literature from export promotion of the government, this thesis will give an insight into governmental initiatives which have the ambition to promote the export of environmental technologies. In addition, using theories from green technology and governmental initiatives, will give clarity of the possibility of green technology transfer in the developing countries.

Keywords: China, wind energy, green technology, green technology implementation, local regulations, government support, climate change

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1. Introduction

"In developing countries, access to affordable and reliable energy services is fundamental to reducing poverty and improving health, increasing productivity, enhancing competitiveness and promoting economic growth".
The World Energy Outlook, 2014

In recent years, climate change, energy resource consumption and biodiversity loss pose challenging environmental issues. Environmental problems are currently receiving renewed attention from public, political and industry leaders (Kanda & Dugand, 2013). These renewed concern can be attributed to major practices shaping the emerging green technology future such as the global impact of environmental challenges, manufacturing and production centres among recent economic crises in some parts of the world. In order to address adequately the current environmental challenges, green technological transitions are required for a future sustainable development (Kanda & Dugand, 2013). The green technological transition should be long – term, multi – dimensional and structural changes in infrastructure, technology and institutions should be also taken into consideration. Furthermore, the development of environmental technologies holds out a three – fold stance: minimisation of environmental footprints, economic competitiveness, as well as promotion of social benefits (Kanda & Dugand, 2013). Nevertheless, developing countries have not produced the desired levels of investment in the development and use of environmental technologies, and most recent efforts initiated by

international organisations such as the OECD and UNEP to stimulate conventional industry towards sustainable production and focus on improvements in the transfer and exploitation levels of green technologies (Kanda & Dugand, 2013).

Furthermore, the awareness for green energy has received an increased focus, primarily due to the impact of climate change. Therefore, alternative energy sources have stimulated an interest worldwide (Kanda & Dugand, 2013). Denmark is seen as a pioneer in the development of sustainable energy solutions on a global level. For instance, the Danish Act of 2008 aims to promote renewable energy and stimulate sustainable development production. Also, the Act main objective is to encourage the usage of wind energy, and includes regulations on:

- Subsidies for wind turbines and other renewable energy plants;
- Schemes designed to promote the installation of wind turbines;
- Accessibility to harness energy from water and wind on the sea;
- Safety requirements for wind turbines;
- Regulation of electricity from offshore wind turbines; (Promotion of Renewable Energy Act, 2008)

Wind energy is these days, though still only a small supplier of the total energy consumption world wide; however it has a potential growing share. Regardless of the most recent financial crisis and political insecurities, the installation of wind turbines had its most successful year on an international plan, with China and the U.S. as the major target markets (Kanda & Dugand, 2013).

The thesis analyses the barriers that green tech companies face when trying to expand their business to foreign markets and a collective goal such as

environmental concern is formed in developing countries, and how local governments, regulations and local actors might influence the direction of their transition into a more sustainable environment.

The process of implementing and using green technology can differ greatly among different countries and regions, even though located closely in political, geographical, or economic terms. In addition, the emergence of elected local governments, decentralisation and immense access to information that citizens have nowadays, have led to circumstances under which green technology use and export have become more complicated (Robinson, 2011). Developing countries face numerous challenges and green technological options might be a solution to address issues such as climate change, globalisation, and the enormous competition that market economies have created (Simmie, 2003). It is argued that developing countries might have the capacity to solve problems that emerge. This implies the need to understand why certain tech green solutions, even if implemented according to the country standards and proven in – life conditions, are rejected (or not considered as an option) by developing countries that could benefit from them, as well as have the resources required to adopt them. Furthermore, what accelerates facilitation or burdens the transferring process for a green technological solutions by local governments, i.e., a developing country such as China has a problem and is looking for green technological solution to solve it (Hunt, 2013; Pierre, 2015; Smith and Stirling, 2008).

The purpose of the thesis is to analyse the role of green technology which plays an important part in the solutions of environmental problems, and discuss models and conditions that can facilitate or burden the process of transition, implementation and

use of green technologies in the developing world. The problem formulation for this dissertation is:

How does the Danish government support Vestas Wind System A/S in providing sustainable solutions to the current climate change issues in China, what obstacles does the company face when transferring its green technology solutions to China, and how Vestas could adjust its strategies to meet Chinese market demands?

These are the foundations for the three subs – questions:

RQ1: *How does the Danish government help Vestas with the transfer of green technology for the solution of urban environmental issues in developing countries?*

The aim of the first sub – question is to reveal how the transferring processes work and what initiatives to implement green technological solutions emerge as well as how the Danish government facilitates the development of green technology transition internationally. As will be discussed in the Analysis Part, this dissertation mainly relies on a case study methodology – Vestas Wind System A/S for the analysis of the necessary conditions and help solving the environmental issues China faces nowadays. The case study is expected to contribute with possible solutions and conclusions that could be applicable to a wider range of similar cases. For example, green tech companies share similar ambition to expand to foreign markets and how their similarities work in favour of successful technology transfer or what burden prevents them from successful transferring process in the host country. In this line of thought, it is possible to identify critical turning points and conditions that can either facilitate or complicate the transfer and use of green technology solutions. Furthermore, it is possible to address this issue by focusing on local governments and the interactions they have with the importing

foreign companies and the green technology, yet the main focus will be the initiatives taken by the Danish government.

RQ2: *How can sustainable energy solutions solve climate change in developing countries and what are Vestas's efforts in launching global projects in China?*

This dissertation also aims to reveal how China directs green technology solutions with the help of Vestas and company's efforts in launching global projects. Also, empirical findings from similar case studies can be used to influence the transition strategies or to better understand the ongoing transfer process. As mentioned previously, China is currently facing a tremendous environmental issue and it is argued to be one of the biggest polluters worldwide. Taking this thought into account, we can assume that companies such as Vestas can provide long – term solutions in terms of energy efficiency and tackling the impact of climate change.

RQ3: *What does facilitate or burden the transferring process of green technology solutions of Vestas Wind System A/S in the Chinese market?*

As mentioned previously, China holds a centralised government and market economy is regulated by government policies. The aim of the third sub – question is to seek answers whether Vestas faces any challenges when trying to expand its business to China and if so does it meet the demands of the Chinese market demands or adjust its marketing strategies to adapt to the Chinese standards and regulations.

The dissertation will begin with a literature review as well as a theoretical framework will be provided, where the theory which is the backbone of the master thesis will be provided. Before discussing the empirical findings in the analysis, the context and background of the case study of Vestas will be presented in further detail. The case study of Vestas will be analysed taking into consideration the theoretical framework. Thereafter, the notion of green technology and sustainable development will be discussed before reaching a final conclusion of the thesis.

2. Theoretical Framework

"A transition can be defined as gradual, continuous process of change, where the structural characters of a society…transforms"

Rotmans, et al (200:16)

This chapter presents the findings of the systematic literature review. The content of this chapter acts as a theoretical framework and it is assumed to be the backbone of the master thesis. It also aims to bring clarity, refine the research problem and contextualise the findings. The literature review will allow the reader to be updated with the state of research in the field of green technology transfer and any contradiction that may arise within research studies. The purpose of this chapter is to provide a theoretical lens through which the problem outlined in the two sections will be elaborated. By having an overview of previous literature and scholarly contributions on the topic of green technology export and transfer. In other words, these explanations can be further described and incorporated into an analytical framework for understanding the empirical data which will be analysed. When the theoretical framework is provided, the next part will be about structuring how it will be employed on the empirical part to ensure credible outcomes. This chapter will include three separate parts that make a comprehensible overview from a general understanding of green technology transitions to particular expectations in regard to changes in Chinese energy sector. The first part is a literature review of renewable energy transition theory in particular. The purpose of the chapter is to give the

reader an overview of available information and scholarly contributions while constructing a theoretical framework for understanding these transitions. The second part synthesises two analytical approaches which describes different (but not competing) explanations of what conditions determine the direction of transitions towards renewable energy.

2.1 Previous research on green technology diffusion/transfer

Technology diffusion explains the collection of adoption decisions by a government or population of potential adopters (Montalvo, 2008). There are certain factors such as drivers and barriers which can influence the entire diffusion process and these processes can be often complex (Kemp and Volpi, 2008). By technology diffusion, we perceive the adoption of wind turbines on a local level. The definition of diffusion is related to spreading of an existing or similar green technology within a national context (Haselip & Hansen, 2011). Yet, it is evident that such classifications may be complex, for instance in countries such as China, the circulation of technology between states may be understood as technology transfer. In addition, it may be also challenging to make a difference between technology transfer from diffusion, where a new technological conception is established, hence it gradually becomes well known on a national level (Haselip & Hansen, 2011). Furthermore, previous research has analysed the diffusion of environmental technologies in different contexts. For example, Kemp and Volpi (2008) discuss factors driving the diffusion process, González (2009) analyses factors which have an impact on the adoption decision whereas Mejía-Dugand et al. (2012) analyse factors facilitating the dissemination of such technologies in developing countries.

The adoption of environmental technologies is usually determined by various economic and institutional factors (González, 2009). A lot of theoretical research has been conducted in regard to engaging environmental innovations, which results in a consensus on the necessity to have resources from both environmental policy (with a preference for market - based approach such as carbon pricing and technology policy (such as research subsidy) (Acemoglu et al. 2012a). There is empirical evidence which has proved that environmental policies are efficient when providing incentives to develop green technologies (see Popp et al. 2009 for a review of this literature). Also, numerous researchers have described the role of carbon pricing on environmental technologies (Popp 2002; Dechezlepretre and Calel 2016). Johnstone et al. (2010) find that price - based policies, such as feed - in tariffs, can effectively increase technological development in the more costly renewable activities, such as wind power and solar power.

Whereas, most of the academic research has focused on the severity of environmental regulations, there is still a necessity for more insights on the governmental policies. Hascic et al. (2010) states for example that unstable environmental regulations can slow down innovation. Also, the instability of state regulations on investments in clean energy technologies has been mainly focused in the real - option framework (Merton 1998) and simulations models of energy markets generally foresee a negative relationship between state regulations instability and clean technology investments (Yang et al. 2008). Developing new methodologies to measure the complexity and uncertainty of environmental policies (Baker et al. 2016; Botta and Kozluk 2014) could bring new insights on how these aspects impact technological change.

We need to gain a better understanding of which state regulations are more efficient in the context of developing countries. In reality, there is not enough information about how state policies can encourage 'adaptive' research and technological development initiatives. For instance, such state policies can focus more on applied research rather than on encouraging radical technological development and innovation. Furthermore, developing countries encounter challenges such as corruption and compliance issues, which might affect the credibility of state regulations. Also, whereas there is some evidence that multinational companies transfer green technologies to their foreign countries in the developing world (Branstetter et al. 2006), more research should be done on the impact of local environmental regulations on the adoption of foreign green technologies. Howell (2016) proves for example that the stringent 2009 fuel - efficiency standards implemented in China were not that efficient in transferring foreign technologies to domestic manufacturers in the automobile industry.

2.2 Previous research on export promotion

Previous research has investigated green export promotion generally from two approaches – the approach of the government and that of the company. From the government's point of view, researchers have taken into consideration on articulating structure, delivery channels, and programme effectiveness (e.g. Lederman et al., 2010; OECD, 1994; Rose, 2007). From the company's point of view, researches have highlighted awareness, participation and perceived program effectiveness (e.g Kanda et al., 2013; Kumcu et al., 1995). Furthermore, the export of green technologies is gaining popularity among governments around the world due to potential markets in emerging economies and the global scale of environmentally societal challenges which are currently being observed. Moreover,

domestic markets for green technologies could be absorbed by states with not so large markets. Yet, many factors can articulate the constant international flow of green technologies, therefore export promotion is considered as one of the opportunities for governments to redirect the types of technologies exported from their countries (OECD, 1994).

2.3 The Theory of Growth and the Environment: The Role of Technological Change in Climate Policy

There is an economic justification for government intervention through export promotion which is based on the theories of asymmetric information related to export (Lederman et al., 2010). Also, market failure is about a market which cannot facilitate production in a manner that the allocation of resources is effective (Borooah, 2003). For instance in export promotion, there are certain externalities in relation to the collection of foreign market information, for example laws, regulations, and business development. A vivid source of market failure in export promotion is information asymmetry between market actors (Beltzér and Zetterqvist, 2008). In this situation, market actors could be absent or disregard the risks associated with various export activities.

In regard to climate change policy models, government is usually able to control the direction of technological development toward carbon - free technologies by introducing policies, or the so - called *induced technological change* (ITC) which aim is to align technological development with better environmental quality (Gillingham et al. 2008) by imposing three methods: energy prices (Jacoby et al. 2006), learning – by - doing (Goulder and Mathai 2000), or research and

development (R&D) activities (Goulder and Mathai 2000; Smulders and Nooij 2003; Acemoglu et al. 2012a). Also, the price – based method implies that an increase in energy prices may stimulate development and innovation by providing companies the incentive to substitute more expensive inputs, for instance renewable energy. The learning – by - doing (LBD) mechanism triggers development and innovation by allowing reductions in manufacturing costs. Learning – by - doing is known to be a mechanism for accelerating technological innovation due to its manageability. Finally, the research and development method triggers development and innovation through investing in knowledge capital which in turn amends the direction of technological change (Popp 2004, 2006).

Furthermore, the direction towards accelerating technological change (via green technological policies) is usually regarded as one of the most vital developments in this area over the last two decades. It also establishes advancements growth theory (Romer 1990; Grossman and Helpman 1991; Aghion and Howitt 1992) that gives mechanisms through which economic growth is promoted by triggering technological progress resulting from investment in research and development (R&D) or accumulated knowledge. In these methods (both Romerian and Schumpeterian), the direction of technological advancement is promoted by incentive methods that allow the accumulation of innovation. There are two elements which characterise induced innovation principles in climate policies: (i) the role of substitution between investment in energy - saving R&D (clean technology) and replacement in other R&D sectors (dirty technology), as well as the role of spillover effects in research and development (R&D). The exchange assumption usually results in crowding out effects that may stop the advantages of environmental policy (Nordhaus 2002), whereas the assumption of complementarity

allows companies to disregard the trade - off between outputs and environmental sustainability because higher savings can be obtained whereas increasing out - puts through greater production levels (Buonanno et al. 2003). Last but not least, recent developments in the empirical literature (Verdolini et al. 2016) describe evidence providing strong complementarity of investments in different technologies (renewable vs. fossil electricity generation capacity) for a successful decarbonisation process in developing countries.

2.4. Climate change debate

This section aims to address the concern about climate change issues and how this phenomena has been perceived in China and shed light on the most recent COVID-19 health crisis and its implication on the climate change talks about green energy transition. This part also aims to give an overview of the growing concern for sustainable development in China.

Nowadays, the impact of climate change on the environment and economic development becomes more visible, therefore we can observe that Europe and China adopt climate change strategy as part of their initiatives for economic growth and sustainable development (Lundin & Ng). There is a need for the development of 'green' economy in China as an opportunity to tackle climate change and also promote sustainable development. The Chinese leadership during the State Council meeting of the 11th National People's Congress (NPC) expressed strong commitment to develop a 'green' and low carbon economy in order to make economic transformation. In this regard, science and technology play a significant role in the process of creating a sustainable future as the deployment of renewable energy and related low carbon technologies are accentuated (Lundin & Ng).

Furthermore, EU – China low carbon technology and investment must focus on the following agenda:

- The incorporation of circular economy and integrated solutions for shortage of water and carbon dioxide emissions.
- Low carbon energy – the utilisation of renewable energy resources and the large – scale reuse of carbon dioxide.
- Energy transition which includes the development of smart grids (Lundin & Ng).
- Low carbon industries – in regard to the energy saving, control of immense pollution and carbon dioxide reduction measures in heavy industries such as chemical, steel as well as the launch of low carbon production facilities.
- Low carbon agriculture and industrialisation of the agricultural sector meaning the reduction of the climate change impact on agricultural production and the adoption of low carbon technology during the industrialisation of the agricultural sector in China (Lundin & Ng).

In the early 1990s, climate change received attention and it was understood as a scientific issue for discussion in remote international negotiations. A shift came in the late 1990s, when China began mainstreaming and integrating climate change into its central economic development framework in response to various core drivers, such as energy security, air pollution, and health issues (Heggelund and Nadin 2017). During that period, we identified three important trends in climate and energy policy. First, with the growing awareness of energy-related emissions, climate change and its impacts on China, the National Climate Change Programme

was issued in 2007, making climate change issues a national policy (NDRC 2007). Rapid energy consumption characterized the period 1990–2013. In particular, 2000–2013 was an energy-intensive growth period in China: coal consumption nearly tripled (Green and Stern 2016), followed by signs of a decline. Attempts to conserve energy and control emissions became a priority in several FYPs— 10th FYP (2000–2005), 11th (2006–2010) and 12th (2011–2015).

In terms of emission trajectory, China ranked lower than developed countries in terms of both aggregate and per capita greenhouse gas emissions. In this thought, the country's emissions amounted to 4 percent of the global total emissions, and China reached only one – half of the global average in terms of per capita emissions by 1989 (Jiahua Pan, 2018). By 2013, China was releasing more carbon dioxide than the European Union and the United States, yet China was trying to take into consideration the impact of climate change. By 2006, China released high emission in terms of production; however it released low emissions on the production side. In this respect, recent scientific research has proved that carbon dioxide emissions are the major contributor to climate change disasters (Jiahua Pan, 2018).

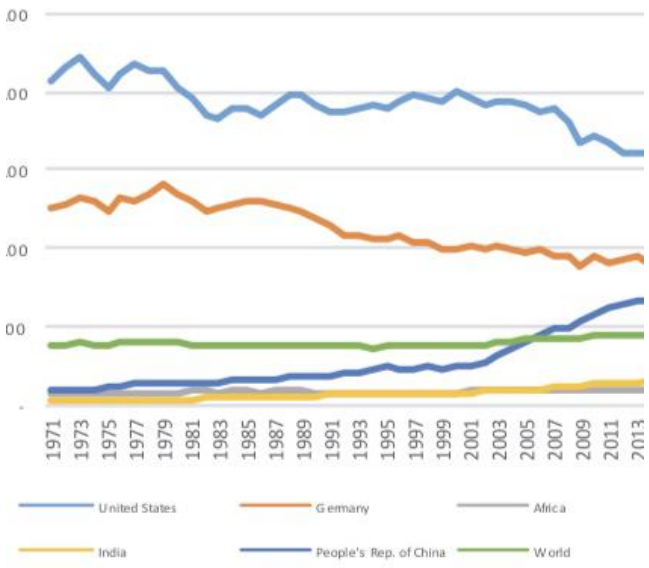

Figure 1. Changes in per capita carbon dioxide emissions in selected countries and regions, 1971 – 2015 (metric tones). Source: (Jiahua Pan, 2018).

In regard to the Chinese economy in the beginning of 2020, China's economy was heavily hit by the Covid – 19 pandemic and carbon emissions have reduced tremendously (Heggelund, 2021). Also, recently the National People's Congress (NPC) did not set any economic development goals due to the unprecedented circumstances. This was assumed as a positive chance for climate change talks as well as the need to make a balance between economic development and socio – economic considerations in China (Heggelund, 2021). Furthermore, the Paris Agreement was vital for China, meaning that policies have shown an emphasis on green growth promoting technological innovation and renewables which has accelerated a tremendous shift in the country's energy policy. At present, China priorities certain measures and regulations to minimise coal consumption and further develop green energy, especially wind and solar (Heggelund, 2021).

Consequently, the pandemic has yielded outcomes meaning that China has emerged as the world leader in green energy and also green production, meaning that future exports of green energy would be a possibility. Despite the Covid – 19 pandemic, climate change is still high on the political agenda, but green energy is considered as a big concern for world governments and it is still assumed to be the most reliable source for sustainable future development (Heggelund, 2021).

2.5. Green technology development in China

In this thesis, green technology and environmental sustainability are not perceived as separate concepts. By contrast, the purpose of the thesis is to shed light on the connection between these two concepts, and analyse the dynamics of the green technology transfer which is necessary to address the collective environmental issues we are facing. Furthermore, the concept of transfer and export are vital to this dissertation because it is regarded that information and knowledge sharing between different social entities and green technology companies is a significant component of sustainability transition taking into account the urgent need that environmental issues need to be tackled. Nevertheless, the dissertation focuses on the fact that this sharing process of transfer and use of green technology is not straightforward, and that a plug – in way to green technology transfer and export processes might face numerous challenges. Also, the necessity to understand the dynamics of green technology is therefore comprehended as vital to facilitate sustainability transitions. It is also evident that developing countries such as China will benefit significantly from other developed countries like Denmark acquiring their environmentally sustainable solutions, yet the main intention is to focus on the adaptation process and the benefits of green technology transfer for local and global environmental sustainability.

Green energy transformation is one of the most profound and complex transformations of development since the Industrial Revolution which has both great advantages and challenges for China (Yongsheng Zhang, 2016). We need to understand what green technology means. In realty, the advantages for green technology cannot be observed in traditional centralised thought. Instead, we aim to understand the concept of green technology in a new way of thinking and also discuss it in the dynamic context of the new technology revolution which has already taken place in most developed countries (Yongsheng Zhang, 2016).

In addition, European businesses have invested steadily in technology accumulation and 'localisation' in China. Recently, European enterprises have become significant market players in climate change related industries such as chemical and energy (Lundin & Ng). They have the knowledge of advanced low carbon technology alternatives in Europe and the Chinese market, hence these enterprises can turn out to be the 'bridge' for EU – China low carbon technology cooperation. Thus, the EU – China cooperation will trigger commercialisation of alternative technologies and adopt large – scale demonstration of technologies which promote renewable energy (Lundin & Ng). The Danish government has initiated an action plan to ensure Danish leadership in the green technology sector and the action plan included enhanced foreign export promotion for environmentally sound technologies. Therefore, export promotion efforts were targeted at the USA, China, Brazil, Russia and India (Kanda & Hjelm). Also, these government efforts were targeted towards more energy efficiency, biomass and wind as well as promotion efforts were to be focused mostly on air pollution and waste recycling. Furthermore, the action plan highlighted the significance of legislation and policy in the development of green technologies in foreign markets and the importance of promoting knowledge and information to Danish companies. Also, action plans for green technologies include

a focus on southeastern Europe as a targeted market for Norwegian industry, which is followed by China, India, sub – Saharan Africa and South America (Kanda & Hjelm). Similarly, Norway makes efforts to transfer clean energy technology by supporting heavily on investment in infrastructure and production in the energy sector of developing countries. Norway's purpose is to make a positive impact to sustainable development and growth in the fields where clean technology has a significant advantage. Last, but not least Norway supports investment and capacity building in regard to green energy technologies (Kanda & Hjelm).

It is believed that green technologies are meant to create effective environmental protection meaning they need understanding of market penetration and geographic distribution. Yet, when markets are not willing to make a connection between supply and demand for green technologies, the government should simulate their development. As a consequence, governments formulate various initiatives to promote the export of green technologies. In this regard, transferring initiatives also include providing support channels which help companies enhance market function of state actors and stimulating companies to become leaders in foreign markets (Kanda & Hjelm).

China is being considered as relatively late in opting with industrialisation forces. In this regard, a lower level of development made China focus on new demands by developing green infrastructure. By contrast, developed countries had to eliminate some outdated capacities in order to give room to green energy solutions (Yongsheng Zhang, 2016). China is also likely to adopt even more rapid market expansion of green technology in the next few years, since its domestic green technology market is still not developed enough to cope with the developed countries. In regard to human capital, China has an abundant capital which is available to make investments in its green sector and there is a great potential for

traditional sector that struggle with low efficiency to upgrade to green techniques and methods, for instance to use the coal in a clean way taking into account that 70% is the total energy consumption in the country. Furthermore, China has an abundance of natural resources for clean energy including wind power and solar power which makes the country not that dependent on fossil fuels and it increases its capacity to accelerate energy security (Yongsheng Zhang, 2016).

Furthermore, Chinese industry is becoming a more unified system and the government started formulating a strategic framework for green transformation of Chinese industry and national green innovation roadmap, therefore the Chinese market might seem attractive for foreign investors in green technology transformation. There is an ambition to promote further research and development of renewable energy solutions, sound technology standards and management norms in line with green manufacturing, ambition to promote industrial transfer, improve the environmental regulation, and further strengthen environmental protection law as well as focus on energy system reform. Corporate environmental responsibility and promotion of enterprises to create green management innovation and accelerate international coordination in clean energy, environment, and climate change in order to provide a sustainable future.

The industrial transformation of developed countries is closely associated with their development stage requirements. Nowadays, industrialised development and environmental governance in China still implement the old methods used by developed countries, hence focusing on the end – of - pipe treatment in terms of system design and incentive mechanism, and lack awareness about green transformation (Ping Li & Zhou Deng, 2013). Nevertheless, the industrialisation characteristics of China at present stage have commonalities with the developed countries in the 1950s and 1960s, i.e. China's industrialisation, therefore also

experiences the expansion of industrial investment, expansion of demand for green energy resources, intensified environmental impact as an emerging industrial country, China can still learn from the developed countries the lessons in industrial pollution control, and gradually get rid of pollution (Ping Li & Zhou Deng, 2013). Through absorbing the world's concepts of industrial upgrading and environmental governance, China can use its advantages and establish green development. Also, the industrial green transformation needs to make a major shift in the development concept, growth, target and direction, and gives attention to the strategic level, take a new approach to industrialisation, strengthen mechanism innovation, as well as improve policy system designed to refine green development of manufacturing industry (Ping Li & Zhou Deng, 2013).

China has numerous advantages in adopting and promoting green technology and long – term sustainable development. Furthermore, green growth relies heavily on market forces, so the condition for the market to promote green technology development is that the ruling government must act in eliminating carbon emissions and protecting the environment (Yongsheng Zhang, 2016). In this line of thought, the Chinese government is willing to accelerate action on high priority topics and its leaders have recently reached an agreement on the significance of green technology growth. The below mentioned paragraphs highlighted seven benefits that can be of a great advantage for China in green technology transformation (Yongsheng Zhang, 2016).

2.6. Export of green technology: The case of Siemens and Ørsted

This part will provide case studies of Siemens and Ørsted which serve as a comparison of companies and governments intervention in promoting green technology transition in developing countries. This section will shed light on the

methods which governments initiate to help state companies promote their sustainable business to accelerate decarbonisation processes in the developing world. In regard to the German green export industry, the energy sector in particular, the Middle East is seen as a fast – growing market. Also, German institutions and agencies maintain relations with local governments and economic institutions to identify major business opportunities for exporting green energy to the region (Picha & Tomek, 2014). Siemens AG – the German multinational conglomerate company played a significant contribution with Middle Eastern institutions as a channel for gaining access to the bids. As a result, the German conglomerate set up its own branch in Oman and due to increasing power demands in Oman, the government was looking for new power suppliers to meet the growing demand in the region (Picha & Tomek, 2014). Furthermore, Siemens submitted advanced green technological solutions and the project became attractive for investors. In fact, German institutions and the government have enabled Siemens' energy technology to be exported to foreign markets and ensured the majority of suppliers, equipment and employment in the host country were secured in the long – term (Picha & Tomek, 2014). Due to German export – oriented economy and efficient government policies, millions of tons of carbon dioxide will be saved and the project in Oman has led to the company's further technological development and access to other engineering bids in the Middle Eastern region, therefore it helped drive the German economy forward. We can conclude that without efficient state guarantees and policies would it be difficult to put the project into practice (Picha & Tomek, 2014).

Moreover, Ørsted established political relations in a country long before entering the Taiwanese and Japanese markets. This has been the case in both Taiwan and Japan (Jensen, 2020). Also, Ørsted manages to persuade governments to look at OWE as part of the country's energy mix, as they try to make demand for their

product. Ørsted has correspondence tracing back to 2012 with government stakeholders in Japan and Ørsted representatives went to Taiwan in 2014, hence long before any tender in Taiwan. Ørsted is not the sole reason for Taiwan's OWE tenders or Japan's expected tenders but is surely an influencer (Jensen, 2020). Furthermore, a government must understand Ørsted as a reliable actor in order to enable Ørsted having any influence. The ultimate goal for Ørsted's relation with a foreign government is to be perceived as a trusted advisor (Jensen, 2020). Furthermore, as OWE is a new market in Taiwan, Ørsted's venture has not only been a big step geographically, but also because the lack of OWE experience of the government and local companies (Jensen, 2020). In other words, lacking government experience can both be positive and negative (Jensen, 2020). Ørsted is attracted to markets with no OWE experience, as that gives Ørsted leverage due to their experience (Jensen,2020), hence the resources and capabilities establishing Ørsted as a trusted advisor and an institutional entrepreneur in Taiwan have been enhanced due to the government's lacking experience.

2.7. Theoretical framework of dissertation

The figure below illustrates the main theoretical framework for this master thesis and the empirical research will be guided upon it. The theoretical perspective has been established based on the literature sources provided about green technology and technology transfer; Green technology refers to a technology that has a positive impact on the environment and society as a whole (Foster & Green, 2000). In contrast to conventional technology, green technology differs in complexity, and it further embraces the explicit purpose of improving company's sustainability performance on a global level as well as contributing to solving climate change issues (Foster & Green, 2000); Technology transfer is the process of transferring scientific findings from one organisations to another, or from one country to another

for the purpose of further commercialisation and innovation (Zunga & Correa, 2008). China's national climate change plan, sustainable development and public awareness in China will be further analysed; Company's efforts in transferring green technology solutions in China and Danish government initiatives are vital in helping state owned companies in launching new projects, regulating energy prices, incentive schemes as well as research and development programmes in exporting green technology solutions to accelerate decarbonisation process in countries which are considered to be releasing carbon dioxide emissions; the theory also takes into account technology transfer to China, company's development and investment projects and new products suitable for the Chinese market demands.

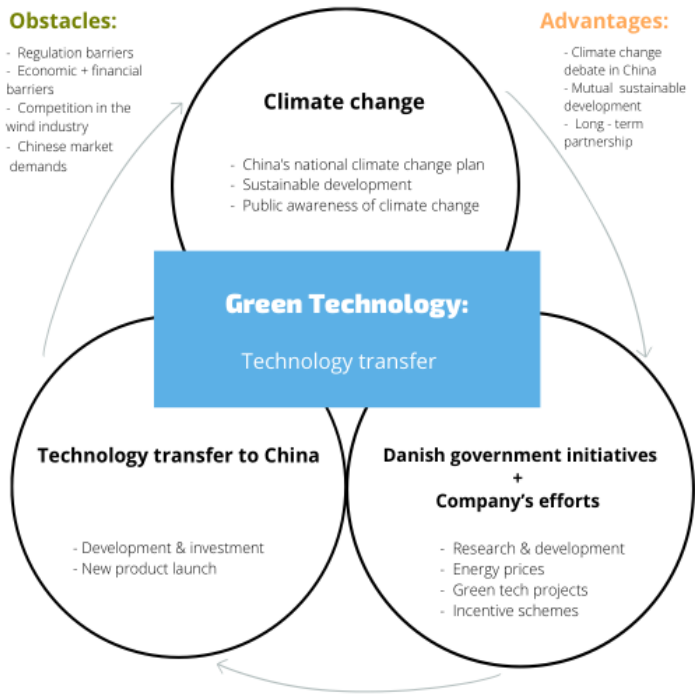

Figure 2. Green technology: Technology transfer; Climate Change; Danish government initiatives and company's efforts; Technology transfer to China;

The theoretical framework further suggests that green technology innovation process, launch an innovation journey that typically begins with finding favourable conditions on the transfer of green technology, taking into consideration China's recent climate change adoption plan, public awareness and Chinese government's ambition to promote sustainable development. After that, the Danish government and the company's goals are to further strengthen their efforts in green technological innovation through various incentive schemes, green tech projects as well as research and development programmes. Consequently, the company's has to explore the specific market segments, and ensure that their products can lead to a commercially successful new product in the Chinese market.

This model further explores the various obstacles and advantages of green technology transfer to China. Technology transfer can take various forms and involve multiple processes. In regard to obstacles, the company might face strict regulation challenges, economic and financial barriers, local competitors in the wind industry and the company's product type which should be aligned with Chinese specific market conditions. This theoretical framework also encompasses advantages on Chinese efforts in tackling climate change, which can further lead to a mutual collaboration with developed countries and long – term partnerships for a sustainable development through the accumulation of green technology solutions. This exploration generates learning outcomes for green technology transfer that may be beneficial on subsequent innovation projects.

2.8. Reflections on theoretical framework

This theoretical framework contributes to the emerging literature on green technology transfer in the developing countries. It proves governments and state owned companies efforts of the transfer of green technology for sustainable development in the developing world. By shedding light on the relations arising from green technology transfer, this theoretical framework aims to support government and companies in making the promotion of green technology transfer, especially in the context of developing countries. It further explores green technology transfer of business practitioners perspective. Despite incentives to move research into production, the practical approaches are very complex to perform in real life – case context. The limitation of this model can be the difficulty in coming up with a new product type suitable for the Chinese market demands and the barriers when it comes to Chinese local regulations.

3. Methodology

The purpose of this section is to describe the methodology utilised for this academic work. It also takes into consideration the context of this dissertation, and provides an insight of the research approach in line with addressing the direction of the study. Therefore, it will give a comprehensive overview of the various methods of the data collection. In other words, these methods include a detailed description of the case study – *Vestas*. Furthermore, the chapter will be concluded by examining the quality of the research and ethics of the dissertation. First, I will address the ontological and epistemological considerations before explaining the choice of the case study, the use of qualitative methods as well as the limitation in the data collection process. This section will be concluded with research quality and trustworthiness in order to give credibility to the thesis.

3.1. Research Approach

The research for this study can be conducted and defined on various methods. In other words, methodological approaches will be reflected upon, as well as epistemological and ontological consideration will be taken into account for this research. Also, the theoretical framework will set the basis for the choice of iterative approach, and the methodological approach is a process to conduct qualitative research.

3.1.1. Deductive, Inductive and Iterative Approach

This research takes an inductive approach which develops clear links between the empirical findings and establishes a theoretical framework of the underlying structure which are present in the data (Thomas, 2006). Moreover, the inductive approach provided a systematic set of practices for analysing qualitative data which has led to credible empirical findings (Thomas, 2006). After the raw data has been collected, the research has taken an iterative approach, and analysing the data was done through moving between theory and data. The iterative approach ensured that all participants are involved in the research process (Mills & Wiebe, 2010).

3.1.2. Epistemological Considerations and Ontological Considerations

This work takes into consideration a social constructivist approach, which states that there is no objective reality or absolute truth. Yet, constructivist research therefore holds on the construction of meaning (Sarantakos, 2013). Furthermore, perception of reality is socially constructed through experiences and interactions with the world which is established on an interpretation that is historically defined (Sarantakos, 2013). Also, the constructivist method through interpretation is conducted as epistemology which takes into account the actor's opinion and perceptions (Sarantakos, 2013). Also, the possibility of technological advancement to contribute to green technological transition is related to its capacity to involve the perspectives and various concerns of the major actors in the research to make sure

that the relevance of this thesis (Modvar, 2005). In this line of thought, the research will require the incorporation of a dialogue with the relevant actors to this study.

This academic work is based on constructivist approach and interpretivism states that the people involved can have different opinions of social phenomena due to the fact that the phenomena is socially constructed through different interactions and experience. Therefore, the aim of this dissertation is not to define an absolute reality, such as what causes environmental deterioration. In contrast, the purpose of the thesis is to gain an insight of the export of green technology as a solution to climate change, and how it is perceived as well as hereby constructed by the actors. Furthermore, this approach has further implications for the research design in order to define what are the issues, what questions to study, what data is relevant to collect, as well as how to analyse the outcome of this study (Philiber, 2009).

Also, the social constructivist approach is an alternative ontological philosophy which refers 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, which potentially can lead to a healthier system with better conditions for internal and external resources (Bryman & Bell, 2015). Moreover, the purpose of the green transition is to achieve environmental sustainability at state, regional as well as international levels (Cancino & Syn, 2018). Also, the green technology transfer has an ontological perspective and represents a connection between the company interference and the environment at the local level. Technological advancements are understood as necessary means to optimise the clean use of renewable energy in economic systems. There is an existing necessity to manage technological

development for a sustainable growth from a holistic point of view (Cancino, 2018). Also, technological innovations require systematic assessment and understanding as well as monitoring of "*the effectiveness of strategies, policies or practices from a holistic perspective*", also political acceptance to orchestrate ecological development and systematic support of green technological transition (Cancino & Syn, 2018).

3.1.3. Qualitative Approach

The method used for this exploratory case study is a qualitative method. In addition, a qualitative approach is utilised to gain a deeper understanding of the perceptions of the research participants regarding a particular phenomenon (Merriam, 2009). Yin (2010) described qualitative research as collecting data from different resources, evaluating the data, and presenting the findings (Yin, 2010). The aim of the qualitative stance is to acquire in - depth and illustrative knowledge to understand the different dimensions of the issue in thematic analysis. Therefore, the qualitative approach is concerned with certain aspects of reality that cannot be quantified, yet it focuses on the understanding and explanation of various dynamics of social relations. Maxwell (2013) states that qualitative research works with use of meanings, motives, aspirations, beliefs, values and attitudes, which relates to a deeper perspective of connections, processes and phenomena that cannot be reduced to the utilisation of variables as it is the case with adopting quantitative approach (Maxwell, 2013).

When it comes to conducting qualitative analysis, the source material is a necessary step to be defined. In other words, this incorporates revealing who was interviewed, which sampling approach was chosen, what the fundamental conditions of the

interviews were and how the text of the interviewer to be analysed was generated (Mayring, 2003) Moreover, in order to clarify the purpose of the analysis and in order to be able to interpret the raw data, the research questions of this study as well as the theoretical background must be thoroughly defined and explained (Mayring, 2003). The research question, sub – questions and theoretical background have been stated in the theoretical framework of the thesis and were then incorporated into the interview guide as well as the coding agenda. However, the used techniques for qualitative content analysis can never be completely standardised, meaning that they should be related to the individual material as well as the main research question (Mayring, 2003).

Nevertheless, the qualitative approach highlights the most important phrases and words from primary data and takes an inductive approach in the relation between theoretical framework and research. Furthermore, this approach includes interpretivism and constructionism as epistemological and ontological stances. Also, a qualitative approach is recognized to get a deeper and reflecting investigation of phenomena, so the reader can have a clear understanding of the problem (Bryman & Bell, 2015). This thesis takes into consideration a qualitative approach by conducting interviews and analysing new observations.

3.1.4. Case study and semi – structured interview

Case studies are particularly suitable for advancing a field's knowledge. In addition, case studies offer an opportunity for innovation and can challenge existing theoretical assumptions (Almeida & Queiros, 2017). This research takes an exploratory case study which is set out to explore green technology transfer in the data and serves as a matter of interest to the researcher (Yin, 1984). Also,

exploratory case study is found to be suitable for this research because it allows the researcher to obtain an extensive and in – depth description of green technology transfer and it is also utilised to explore casual links that are found to be complex for conducting a survey (Yin, 2014). Furthermore, exploratory case study can also be a complement to semi – structured interviews. Yet, it can be challenging to create a connection to generate conclusions as well as it can be difficult to generalize, specifically when a small number or case studies are taken into account (Almeida & Queiros, 2017). Also, pilot interview is considered as an essential part of exploratory case study, which helps building the design for later research and it is considered as an initial attempt to observe if the phenomena being studied is adequately chosen by the interview process (Yin, 2014). The researcher was able to identify some meaningful directions for further interviews and the pilot interview further strengthened assumptions coming from the literature. The case study for this thesis is Vestas Wind Systems A/S, which is a Danish installer and service provider of wind turbines and it was chosen because it provides sustainable energy solutions globally with the purpose of creating a more sustainable future. The dissertation also touches upon climate change which lies high on Vestas agenda and China as the main target market which will be further analysed in terms of challenges when it comes to export and local regulations.

Furthermore, semi - structured interviews are an assessment approach whose aim is to obtain and compare answers from all the participants in the interview. The participants are asked about their individual experiences and proposed hypothetical observations (Almeida & Queiros, 2017). In addition, the interview process is standard for all people who agree to participate in this study. This research takes in-depth interviews which are a type of unstructured, direct, and personal interviews with each interviewee. During this interview process, the researcher started with a

general question, and then encouraged the interviewees to speak more freely. There is a possibility that this study takes into consideration semi - structured interviews, in which there is a set of pre - defined questions, in which freedom is given to explore some of the questions more in detail. Also, in - depth interviews provide concise information and they give the opportunity to ask follow - up questions, additional information, justify previous answers, and establish a relation between various topics. In this research, participants were able to share further information in regard to green technology transition and challenges that the company is facing in the Chinese market. Last but not least, the in-depth offers a comfortable atmosphere in which people may feel more comfortable to establish a conversation (Almeida & Queiros, 2017).

3.1.5. Interview guide

The interview guideline was structured by using the theoretical framework. Furthermore, the interview guide consists of open questions, where the participants could interpret and answer the questions freely, which has resulted in generating more insightful data (Bryman & Bell, 2015). Also, the interview guideline was structured to provide an insight of the case company's strategy and current operations in the Chinese market. By constructing the semi - structured interview guide, the participants could develop the questions as far as they wanted and even this has led into new themes which were further analysed. The duration of each interview lasted approximately 10 – 15 minutes and all interviews were conducted in English. The semi – structured interview allowed making adjustments of some questions as it was necessary to obtain more data from the interviewees who have different expertise. As a result, enough primary data has been collected for the analysis part of the thesis.

3.1.6. Sampling

Snowball sampling which is also known as chain - referral sampling is a non – probability sampling method which is mostly used when characteristics of participants are hard to find (Parker & Geddes, 2019). This sampling method involves raw data sources choosing other potential raw data sources to be utilized in the project. In other words, snowball sampling method is based on referrals from initial subjects to generate additional participants for the study. Hence, whereas applying this sampling method members of the sample group are recruited via chain referral. (Dudovskiy, 2018). This dissertation takes into account snowball sampling which is considered as one of the most common methods of sampling in qualitative research, and one of its main characteristics is networking which is vital for this research (Dudovskiy, 2018). In this study, the researcher started with initial contacts who are assumed to be a good fit to the research criteria and they were later invited to become participants within the project. Afterwards, the participants, who agreed voluntarily to take part within the research, were asked to recommend other people who fit the research criteria and who potentially might also be willing to participate. Therefore, it is necessary to use social networks to establish initial connections, with sampling developing from creating an increasing chain of participants (Dudovskiy, 2018).

Also, snowball sampling is the most common in business studies focusing on a specific company that involves raw data collection from employees of that respective company. Once contact details have been established of one employee she/he can help in order to recruit other employees to the research by providing

further contact details (Dudovskiy, 2018). There were six interviews conducted for this thesis, which lasted between 10 – 15 minutes each and the interviewees were employees from Vestas working in global business development, project management and global product integration. Furthermore, before the interviews, all participants were informed that their answers would be used only for academic purposes and their identity would be preserved. Due to the process of protecting private and sensitive information such as names and age, the researcher has taken into consideration data anonymization which maintain the data but preserve the source anonymous (Imperva, 2021). The data anonymization method used for this research is generalisation which has eliminated some parts of the raw data in order to make it less identifiable but at the same time keep data accuracy and credibility (OmniSci, 2021).

3.1.7. Thematic analysis

Thematic analysis is the process of identifying patterns or themes within qualitative data. Braun & Clarke (2006) states that it is the first qualitative method that should be learned as '..it provides core skills that will be needed for conducting other types of analysis'. Another opportunity of using thematic analysis is, particularly from the perspective of gaining knowledge, is that it is a method rather than a methodology (Braun & Clarke 2006; Clarke & Braun, 2013). In other words, unlike other qualitative methodologies, thematic analysis works well with ontology, epistemology and iterative approach taken for this study. This makes it a comparably flexible method, a considerable opportunity given the diversity of work in obtaining knowledge (Braun & Clarke, 2006). Ruthie more, Braun & Clarke

(2006) provide a six-phase guide which is a very useful framework for conducting thematic analysis:

Step 1: Become familiar with the raw data

The first step in any qualitative analysis is reading, and re-reading the transcripts (Braun & Clarke, 2006). The researcher became familiar with the raw data extracted from the interviews in order to generate initial codes and organise the data thoroughly.

Step 2: Generate initial codes

In this phase, the researcher started to organise the data in a meaningful and more systematic way. Coding reduces lots of data into small pieces of meaning (Braun & Clarke, 2006). In fact, there are various ways to code and the method will be determined by different perspective and the respective research question. The researcher was concerned with addressing the main research question, sub – questions when analysing the data. In this line of thought, the researcher coded each segment of the primary data that was relevant to or found something important in regard to the main research question or sub - questions. Yet, the researcher did not code every piece of text. Instead, the researcher used open coding, meaning that there were no pre - set codes, but developed and modified the codes through the whole coding process.

Step 3: Search for themes

As mentioned earlier, a theme is a pattern that caught something significant or interesting about the primary data and/or research question. As Braun & Clarke (2006) describe, there are no hard and fast rules about what makes a relevant theme. Instead, he states that the theme is characterised by its importance and relevance. For instance, if there is very small data set, there may be considerable overlap

between the coding stage and this stage of identifying preliminary themes (Braun & Clarke, 2006). For this purpose, the researcher has highlighted the most significant themes which were relevant to the main question and the sub – questions.

Step 4: Review themes

During this phase the researcher had modified and developed the preliminary themes that were identified. At this point it was necessary to gather together all the relevant data for each theme. The process was done manually, on paper by easily using the 'cut and paste' function to the transcripts (Bree & Gallagher, 2016). The primary data was associated with each theme and considered whether the data really was suitable to it. The next step was to consider whether the themes were suitable in the context of the entire data set. In this thought, the data set is one extract and the researcher made sure how the themes work both within a single interview and across all the interviews.

Step 5: Define themes

This is the final refinement of the themes and the purpose is to '..identify the 'essence' of what each theme is about.'(Braun & Clarke, 2006). In fact, analysing qualitative data can generate challenges, not least for inexperienced researchers. In order to make explicit the 'how' of analysis, the researcher applied Braun and Clarke (2006) thematic analysis framework to data. This method has helped to illustrate the work involved in getting from transcripts to themes.

The themes and the sub – themes that have emerged during the coding process were as following:

Climate change and China, Chinese government and public response to climate change; Danish government initiatives, technology implementation process in China, regulation of energy prices and Vestas projects; Challenges in the implementation of green technology, Vestas' competitors in the Chinese market; Vestas and the Chinese market demands, and Vestas' efforts to adjust its production according to Chinese market;

1.1.Research design and research approach

This research is a case study which allows the research to explore the company's main objectives, target markets, and technological innovation. This thesis explores the company through a qualitative approach with semi – structured interviews. According to Saunders et al 2009 case studies are suitable for qualitative research that aims to gain a comprehensive understanding of a certain problem. Also, in order to explore Vestas target markets, and internationalisation strategy the case study design was the most appropriate method. When choosing a case study design an unstructured interviewing is possible to conduct, since the case study design helps generate extensive and more detailed data (Bryman & Bell, 2015). Whereas conducting a case study, primary and secondary data have been combined. Furthermore, primary data is collected through interviews and observations while secondary data has already been collected for another purpose (Eriksson & Wiedersheim-Paul, 2014). Also a semi - structured interview was utilised to give an insight in Vestas their internationalisation strategy. The following steps provide an understanding of the structure of this research:

1. Research questions – A literature study was carried out to understand the fast growing wind power industry, emerging economies such as China have been

explored, altogether with the observation of the wind power industry, government initiatives in supporting the transfer to green technology in developing countries and local regulations that might burden the implementation process (Pataci, et al., 2015). In sum, the aforementioned observations have presented an opportunity to add to the research field of green technology innovation and the wind power industry, by studying Vestas operations in the international market.

2. Selection of a case company – The initial research idea was to conduct a comparative study between Siemens and Vestas, however due to challenges to connect with employees of Siemens in northern Europe, as a result, the researcher choose to focus on Vestas operations in the Chinese market and to explore the underlying factors of Vestas business model, as well as triggers for their market internationalisation.

3. Data collection – The data was collected through 15 - 20 minutes recorded semi - structured interview in English with employees who work in business development with the Chinese market, business strategy and product development. They provided a detailed insight in the company's strategy and internationalisation phases. Moreover, secondary data was collected to put an emphasis on the primary data.

4. Data presentation – The collected secondary data was presented to build up an understanding of the current wind energy industry, green transition and its dynamics in the Chinese market. The primary raw data, which is the interview with the participants, was transcribed, and therefore used to give a detailed description of the company and its operations in empirical findings.

5.Data analysis – In the thematic analysis, raw data from empirical findings was connected with the theoretical framework which allowed a discussion of the implication of Vestas company.

6. Conclusions and observations – Through the analysis and discussion, conclusions could be drawn to answer the main thesis research question and sub - questions. Last, but not least, observations of opportunities and challenges for further research were presented.

3.1.1. Ethical considerations

Ethical consideration is a significant component when conducting academic research, in order to avoid harming, or violate the interviewees privacy (Bryman & Bell, 2015). In addition, it can also lead to a negative effect for further research, hence research ethics should always be a high priority in every research. Bearing this in mind, the participants were given an introduction about what the research was about, its purpose and that is voluntary, before asking for permission for recording the interview. Furthermore, participants were also informed that the audio - recording would be transcribed in order to increase the plausibility of empirical findings. Also, one of the most valuable assets for an individual and businesses is time, therefore the participants were given an appreciation for participating in the research and sharing information which made this dissertation more credible. Last but not least not to cross research ethical boundaries, the participants identity has been preserved as they gave their consent to participate voluntarily as industry professionals. Some of the participants did not want to disclose a lot of information about company's strategies to adjust their product type in order to meet Chinese market demands which is one of the sub – questions and a part of the main research

question of this academic work. The researcher has respected that some of the respondents found the question sensitive and such data should not leak outside of the company. However, most of the participants have provided an answer to this question, which was enough for analysing the data.

3.2. Research quality and trustworthiness

In order to ensure high quality in a qualitative research it is vital to provide trustworthiness, which can be done by adopting one out of two concepts which both contain four factors (Bryman & Bell, 2015). This thesis has chosen to certify the trustworthiness by referring to the four factors, credibility, dependability, conformability and transferability.

3.2.1. Credibility

The credibility factor covers numerous accounts of social reality and the awareness of credible aspects of the respective phenomena. In addition, plausibility is stated 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 that the investigator has correctly understood the social world*" (Bryman & Bell, 2015). To let the interviewees review and validate the research is 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, 2015). This dissertation aims to be a contribution in the field of

export of green technology and the wind energy industry and was afterwards sent to the interview participants for validation, in order to ensure a high credibility.

3.2.2. Dependability

In order to provide trustworthiness in this thesis, dependability has been addressed as "*researchers should adopt an auditing approach*" (Bryman & Bell, p. 403 2015). Also, in order to ensure dependability, this dissertation is based on audio - recorded interviews which has been transcribed to enable auditing approach where expressions and words have been used to strengthen the empirical findings. Furthermore, the entire interview material altogether with the audio - recording, transcription and notes have been kept from all phases of the research process (Bryman & Bell, 2015).

3.2.3. Conformability

Conformability covers the objectivity in the academic research during the data collection process. Although "*complete objectivity is impossible in business research*" (Bryman & Bell, p. 403, 2015). The researcher had no previous connection with the case company or the interviewees and the thesis has been based on the audio - recorded interview and used in an objective manner. This factor is not relevant for this qualitative research since it has a strong subjective component.

3.2.4. 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, 2015) This dissertation addresses the context of

dynamics of the wind energy industry which can be viewed as subsidiary to the whole energy industry. Last, but not least, detailed empirical findings, significant for Chinese market, have been provided in this research, which made it possible to apply on similar operations in the same industry with similar market conditions.

4. Analysis

"Investing in cleaner, greener technologies that allow us to strike a more sustainable balance with the other living systems of this earth – this, too is a choice."

Martin OMalley

This chapter will present the results of the case study of the Vestas Systems A/S and discuss them in light of the expectations presented in the previous chapters. The objective of the chapter is to give greater clarity to what empirically explains observed in the green technology transfer to China, therefore that conclusions and a definitive answer to the research question can be made in the next and final chapter. The discussion and analysis in this part will be structured around five themes and five sub – themes which have derived as a result of the coding process. These themes and sub - themes are determined through the participants most relevant expressions and words as well as supplemented by the researcher observations and assessments. Furthermore, it is observed here that the conditions for green technology implementation in China are the respective local regulations, Danish government initiatives and company efforts.

The chapter has five sections. The first one will expand upon the general perception of climate change in China and give an overview of Chinese

government response and public opinion in regard to combating climate change. During the analysis, interviewee's point of view will be analysed altogether with literature. The interview is one of the data collection techniques and as such literature explores green technology transfer, government initiatives and climate change which are linked to interviews. It will have a focus so as to highlight the importance of taking actions against climate change as a necessary precondition for further decarbonisation actions such as implementation of green technology. Section two will detail the Danish government initiatives in supporting Vestas, focusing on transfer process, regulation of energy prices as well as projects which Vestas take on in green technology transfer. The third theme and sub – theme will cover the challenges that Vestas is facing in China such as the emergence of other green technology companies which are in direct competition with Vestas. Furthermore, the fourth theme and sub – theme will focus on the company's efforts on launching global projects and actors involved in supporting Vestas' technology export to China. The last theme will discuss the company's efforts in adjusting its production in accordance with the Chinese market demands. Lastly, the last section will summarise the findings in the previous five sections and discuss the success/challenges in the implementation of green technology, the explanatory factors on the development of green technology in China over the entire analysis.

a. Climate change and China

Nowadays, reducing greenhouse gas emissions is one of the vital actions in fighting climate change issues. According to the principle of "*common but differentiated responsibilities*" of the UNFCCC, the Parties included in Annex I to the Convention should take the initiative in tackling greenhouse gas

emissions (Lewis, 2007). In regard to developing states with less historical emission and current low greenhouse gas emission, their main target is to achieve sustainable development in the long – term. Moreover, as a developing country, China's aim is to strengthen its sustainable development strategy and take necessary measures such as energy efficiency improvement, development of renewable energy, and ecological preservation, and take further action in the protection of the global climate system (Lewis, 2007). Furthermore, the world's largest emitter of greenhouse gases, China has become an object of scrutiny as climate change has become an emerging debate (Lewis, 2007). In recent years, there is an international attention to the global climate change issue which in turn had an effect on China's domestic policy, through institutional restructuring, whose purpose is to create government coordination on climate - related policy initiatives. Also, China has recently adopted its first national climate change plan, which includes measures being taken across their national economy that might help reduce China's greenhouse gas emissions release (Lewis, 2007). One of the respondents has mentioned that he/she is aware of the national action plan taken by the Chinese government: *" …but the Chinese government has introduced a national action plan to reduce the coal consumption and improve air quality…so, yes I believe they are taking it more seriously."* [Appendix 3]. Another interviewee has also stated her/his awareness about the Chinese government action against climate change: *"…I heard recently that the Chinese government has launched its own national carbon market, so they are taking steps forward towards its decarbonisation.."* [Appendix 2]. In addition, employees of Vestas are informed about the Chinese climate change initiative which goes in line with their ambition to export green technology to China and promote sustainable development in the long – term. A necessary condition of Vestas green transfer ambition is to have

favourable conditions in China, meaning that the Chinese government is taking further steps to strengthen its climate change efforts. However, China is still facing major challenges in tackling its increasing contribution to global greenhouse gas emissions, as one of the interviewees mentioned that: *" ...the country is still struggling to avoid more pollution"* [Appendix 2], also another employee expressed its concern that China is still heavily dependent on coal consumption: *" ...I know that China is still dependent on the coal industry, so there is so much to be done before it becomes carbon neutral."* [Appendix 5], and this will possibly require a much more effort than what might have been already achieved. Furthermore, understanding the origin of these challenges in the Chinese context will bring clarity in China's position in international forums as well as it can give us further insight into how international communities might engage China in tackling climate change. Another respondent has expressed his opinion in regard to the Chinese international stance in the fight against climate change issues: *"...I think the government is trying to position itself as an international leader in combating climate change.."* [Appendix 6]. It can be assumed that China is being perceived as taking further steps in climate change initiated by its participation in international summits related to environmental issues.

We have come to the conclusion that China aims to strengthen its global position in terms of combating climate change issues through adopting national climate change plan which is aligned with Vestas' goal to transfer their products and achieve a mutual sustainable future though green technology solutions.

- Chinese government and public response to climate change

In regard to the Chinese government response to climate change, it has released its first "National Assessment Report on Climate Change" 2006, published as a collaborative effort together with more than 20 government departments (Lewis, 2007). Also, it was set to the Intergovernmental Panel on Climate Change reports, the Chinese assessment consists of three parts: climate change history, its impacts, and socioeconomic factors (Lewis, 2007). Therefore, China has published its National Climate Change Program report on June 4, 2007. This report has given a comprehensive analysis of the policies that China currently has taken that are supporting the country to minimise its greenhouse gas emissions and to help the country make a transition to climate change impact (Lewis, 2007). A respondent has mentioned also that: *"...I have read that the president of China has announced that China will strengthen its climate change target.."* [Appendix 5]. Most of the policies stated in the climate change plan are not climate change policies but policies promulgated throughout the economy, specifically in the energy sector, whose main purpose is to minimise greenhouse gas emissions. Furthermore, the majority of these policies have been adopted to help China accelerate its economic development strategies and also helping China to mitigate greenhouse gas emissions. In addition, the three key policies are energy efficiency, renewable energy, and industrial policies (Lewis, 2007).

Additionally, different actors in China, besides the Chinese government, have a desire to reach international standards (Lewis, 2007). Likewise, China's economic growth is heavily dependent on the global integration of its renewable energy system, and it cannot become technologically or institutionally excluded on the climate issue. However, the government will not likely be able to radically amend its current energy development trajectory without necessary international

engagement any time soon, as well as a period during which China's energy infrastructure investment decisions will have implications for the future stability of the global climate system (Lewis, 2007).

Moreover, all levels of government perceive raising public awareness as a vital part to address climate change issues. In this regard, China has taken measures to promote the climate change awareness of all levels of government as well as decision - makers institutions, to create a leadership team having strong understanding of global climate change issues (China's National Climate Change Programme, 2007). A respondent has noted that: *" ...the most recent survey proved that the public support the government's action on that matter.."* , meaning that the participant is informed about the rising public awareness in China about climate change matters.

Furthermore, the UNFCCC has set the objectives and the principles to address climate change issues, based on which the Kyoto Protocol further established the specific greenhouse gas reduction targets for Annex I country Parties (China's National Climate Change Programme, 2007). Also, all parties are supposed to fully implement their commitments under the Convention and the Kyoto Protocol. Moreover, developed countries should fulfill their commitments of taking the initiatives to minimise their greenhouse gas emissions and green technology transfer to the developing countries. Last but not least, China will potentially fulfill its commitments under the Convention and the Kyoto Protocol (China's National Climate Change Programme, 2007). In order to support the aforementioned objectives of the Kyoto Protocol, an interviewee mentioned that: *"... when the Kyoto Protocol entered into force, China became a member of it…So, yes China is making some efforts in the climate change action plan.."* [Appendix 4]. In fact, the Kyoto Protocol has become vital for Chinese international image as taking further

steps in tackling climate change matters. The interviewees were aware of Chinese commitment in tackling climate change issues which is assumed to be a good opportunity for Vestas to strengthen its presence in the region.

To conclude this theme, both the theme and the sub – theme have provided clarity that the Chinese government has taken further initiatives on combating the climate change which partially answers the second sub – question of this thesis. The fact that the Chinese government has already made some efforts in tackling environmental issues, is seen as an opportunity for Vestas to transfer its green technology solutions to China. Having already enacted a national climate change action plan and being a member of Kyoto Protocol, is perceived as a necessary precondition for Vestas to expand its services in the Chinese local market. Last, but not least participants's answers have provided comprehensive data on that matter.

b. Danish government initiatives in supporting Vestas transfer of green technology

During the Global Green Growth Forum held in Copenhagen, the Danish government announced that it would support Vestas with developing a wind project on the Sumba Island in Indonesia (Evwind, 2014). Furthermore, the project would be part of Vestas' Wind for Prosperity programme, and was also declared by the Indonesian government (Evwind, 2014). Moreover, through its Wind for Prosperity programme, Vestas would supply wind turbines and Danish government development programme, Danida, would fund the viability gap in the project (Evwind, 2014). In regard to the employees who participated in the interview, one of them has stated that: *" ...you have probably heard that project 2030, the company aims to build an artificial island. That kind of mega project we cannot see without the government support…The project is also great for us – they gives us*

pipeline, gives us engineering targets…we are talking about very very complex projects, so this kind of very concrete examples of how the government is supporting us….so all the investment, financial investment in the infrastructure is really important for us, probably the best think the government can do to help us." [Appendix 2]. The respondent has clearly stated that the Danish government is supporting Vestas and the majority of the projects that they launch are supported by the government. Another interviewee has also mentioned that: *"…but I think it would have some kind of consideration before they launch any energy policy or something…"* [Appendix 3], meaning that Vestas always takes into account the government before they take steps further in launching their projects.

The Danish government has affirmed its commitment to developing Denmark's image as a global hub, as well as representatives from the wind sector signed a Memorandum of Understanding, titled 'Second to none wind energy framework – think Denmark' and its aim is to strengthen and improve the existing cooperation between Denmark and the global wind energy industry, having the idea that Denmark is ranked as the best partner for the global wind energy industry (State of Green, 2019). Furthermore, the Danish government is planning to maintain Denmark's reputation by establishing state – of – the - art framework conditions and an appropriate environment for the wind industry within fields such as research and development, and a market for onshore and offshore wind (State of Green, 2019). In this line of thought, another employee said that the Danish government has support Vestas in their operations in China: *"There are a few projects that we are launching in China and the government has been supportive in terms of pushing this project forward.."* [Appendix 4]. There is an interdependence between the government and Vestas in pushing projects forward towards decarbonisation in the developing countries as well, which in turn maintains the reputation of Vestas as a global leader of providing sustainable solutions worldwide. Another interviewee has also

confirmed that: "…*So, the Danish government is supporting Vestas in terms of financial schemes, projects we would like to initiate in the near future and also pricing regulation. Also, in terms of infrastructure, we push the government to provide us with subsidies since implementation of infrastructure is vital for us…"* [Appendix 6]. In this line of thought, the Danish government is regulating the financial schemes, providing financial support through grants, but also Vestas takes initiatives in order to prompt the government to help in launching big projects worldwide such as taking wind energy solutions as a main priority, and including it in the strategic agenda.

An interviewee has stated that: *"…I think they have some target that Vestas need to fulfil to keep reducing the level of carbon dioxide and sustainability ambitions and something like that…"* [Appendix 5]. In line with the government and Paris Agreement objectives Vestas aims to keep the level of carbon dioxide relatively low and meet the sustainability standards. Additionally, the parties had also established a dialogue forum with annual status meetings that would cover the Danish conditions for the industry as well as ongoing development within the sustainable energy area (State of Green, 2019). In addition, exporting green energy technology is one of the core objectives of the Danish Government's initiatives to tackle the carbon footprint with 70 percent by 2030. According to the Confederation of Danish Industry, Denmark is the country where energy export brings the most to the accumulated export, and that makes the Danish economy very dependent on continuous development in the green technology field (State of Green, 2019).

The Danish government helps Vestas maintaining its image within the wind industry on a global level through providing financial schemes and launching global projects worldwide.

- Regulation of energy prices, and green technology projects

Danish politics have always been concerned with green ambitions and sustainable development. In addition, the government published a draft for its renewable energy policy, where the major objective was further electrification by lowering electricity costs, as well as expanding 800 MW of offshore wind and an annual 215 MW of solar and onshore wind in the coming year. Also, the Social Democratic party initiated a plan for 3 GW offshore wind in 2018 (Plechinger, 2018). Keeping the energy costs low makes the company even more competitive in the foreign market. A respondent said that: *"...the government is trying to regulate the prices when it comes to export."* [Appendix 4]. The respondent has confirmed that lowering energy prices may be beneficial for their business in the Chinese market and the Danish government is taking this into consideration.

In sum, taking everything into consideration, we can conclude that the Danish government is supporting Vestas in launching big projects on a global level and company's main targets are in line with government initiatives to promote sustainable technology solutions and sustainable development, not only in the Nordic region but also in the developing countries, for instance exporting green technology to China. This paragraph provided clarity for the second sub – question of this thesis, about how the Danish government helps Vestas in transfer of green technology solutions to China, lowering energy costs aligned with Chinese market and also, in terms of the global projects the company has launched. The goals of the Danish government are well aligned with Vestas objectives, although there are several obstacles which have been investigated and they will be described in the next section.

c. Challenges in the implementation of green technology in the Chinese market

In recent years, China has been showing some progress in adopting green technologies and is continuously making efforts to develop it even further. (Matus & Zimmerman, 2012). Yet, the dynamics of shifting towards green technology and sustainable energy production are vital elements for addressing the issues between economic growth, environment, and towards a systematic implementation is still considered as a complex process (Matus & Zimmerman, 2012). In reality, China is currently facing various challenges to implement green technology in a systematic and effective framework, although being aware of economic and environmental advantages. This theme will analyse the challenges Vestas is facing in China, and policies that are currently present, in order to aid in the future development of green technology in China (Matus & Zimmerman, 2012).

In addition, China has a different perception for green technology and sustainable development than countries in the developed world. Furthermore, China is trying to solve the environmental impacts of almost three decades of rapid economic growth, which has often come at the expense of preserving environmental quality (Economy, 2004). Also, there is an investment in new capital infrastructure, which in turn established advantages for the implementation of new green technology. Moreover, within the Chinese context of a rapidly progressing economy experiencing significant development, investors such as Vestas can face several different types of challenges during their attempts to develop and implement new green technologies (Matus & Zimmerman, 2012). In China, there are several barriers that have been experienced, therefore directly impact green technology export from foreign investors. Additionally, they were identified based on the qualitative interviews in this thesis, and supported by the literature. In other words, there is a competition between economic growth and environmental agendas,

regulatory barriers, as well as economic and financial barriers (Matus & Zimmerman, 2012). One of the participants has admitted that Vestas has faced several challenges during the implementation of green technology: "*..it is very different with a lot of restrictions in regard to confidentiality…they have one of the main restrictions in production…this requires all systems are adapted to their market..'* [Appendix 5]. Furthermore, another responded has also revealed that: *"…There are a lot of challenges such as domestic laws in China and Chinese production advantage turned complicated for wind turbine in 2018 when US – Chinese trade war started which means that harsh tariffs on Vestas export to China made it challenging, which as a result there was a big threat to Vestas global supply chain…"* [Appendix 6]. Apparently, in addition to the strict requirements of the Chinese government, the most recent trade war between US and China has further posed challenges for Vestas and harsh tariffs on their export, hence it has slowed down green technology diffusion in China.

There are several challenges which have been investigated during the research process: regulatory barriers, economic and financial conditions in the Chinese market segments burden Vestas' ambition to further strengthen its presence in their market. In addition to that, the most recent trade war between China and the US has created unfavourable conditions for foreign investors, for instance China has imposed harsh tariffs on all foreign export products, therefore the war had a huge impact on the production base of Vestas.

- Vestas' competitors in the Chinese market

In the last decade, there are a few Chinese energy companies which have launched and have been in direct competition to Vestas in China. Goldwind is the second Chinese manufacturer to make the top five companies in the Chinese market, and

Envision have installed new capacity in 2019, as well as onshore and offshore turbines (Campbell, 2020). Most wind turbines were installed in China, despite the company's plans of installing turbines in the European and North American markets. In fact, the company had already established research centres in Denmark, and has served as a turbine supplier (Campbell, 2020). Almost all of that new capacity was built in the Asia - Pacific region, mainly in China, but Goldwind secured orders in countries such as Canada and Australia. Furthermore, it has a strong presence outside the Chinese turbine (Campbell, 2020). As one of Vestas employees has said: *"... There are a lot of players that are coming there which could be new, but have a big potential because they are very flexible…"* [Appendix 5]. An interviewee has also stated that *"…the market is dominated by local players…"* [Appendix 6]. Most of the participants have stated that fierce competition is emerging in the Chinese market and the Chinese government benefits their domestic companies which additionally poses another challenge to Vestas .

Furthermore, Chinese companies within the wind turbine manufacturing value chain tend to have advantages to develop more quickly than the market by virtue of China's strong domestic demand and instalment into the supply chains of global markets (Campbell, 2020). Meanwhile, states are increasingly moving towards wind power as a new sustainable form of alternative energy. In addition, Chinese companies have a cost precedence over foreign competitors whereas their technology is continuously developing (Campbell, 2020). For instance, Chinese companies like Titan Wind and Weihai Guangwei have been growing their market share within Vestas' value chain. Also, Titan Wind has established itself as a supplier of wind power to global turbine manufacturers. Moreover, it supplies more than 10% of Vestas' wind power, while also growing its market share at General Electric and Siemens. Last, but not least, Guangwei is a leading carbon producer in China and supplies Vestas with its production of wind turbine blades (Campbell,

2020). To highlight the aforementioned above, one of the respondents has stated that: *"…they have their own companies the size of Vestas, namely Minyan and Envision.."* [Appendix, 2].

In addition, the intensity of the competition between existing suppliers is also determined by the number of competitors, their size and the development of the wind power industry (Bullard, 2020). Also, the rivalry between the existing manufacturers in the wind power industry has been very dynamic in the past few years. In other words, over the last few years, it had gone through a turbulent period, from being dominated by some actors with high market power, it has now turned into a market with many actors involved and a comparatively high level of competition (Bullard, 2020). Also, development has an impact over the instability and instead it tends to increase the competition in the wind power industry, meaning that the current period is unfavourable for Vestas, as the other players wear Vestas' market share and revenue advantages. In fact, this can be assumed as an outcome of the Chinese enterprises explosive development in the rapidly growing Chinese domestic market (Bullard, 2020).

It is assumed that for Vestas, it will be challenging to keep a close overview of the parts produced, and hence, it is necessary to establish a high degree of communication and trust between Vestas and its suppliers. Therefore, as a result of the constant technological development as well as growth in the market there are numerous new competitors (Bullard, 2020). This has contributed to a decline in Vestas market share, and has put a lot of pressure on Vestas' strategies, as more competitors begin to have similar operations especially in the Chinese markets (Bullard, 2020). An interviewee has mentioned that: *"…the Chinese market changes our outlook on where we rank globally, Vestas position is not number one in the Chinese market in terms of schemes. I think they have moved to option based*

just like the rest of the world, but it's a bit high to compete price wise… its all about how much you have installed in the quality but in terms of materials…" [Appendix, 4]. The participant mentioned that Vestas is not a leading wind energy provider in the China due to the fact that there are new state owned wind energy companies emerging in China which are considered to be in direct competition to Vestas.

To conclude this theme, the fierce competition in the wind industry has intensified tremendously over the years, and there are many new competitors to Vestas, some of which aim to become stronger in the Chinese region, in terms of finance and market share (Bullard, 2020). Also, Chinese market relies heavily on technology and its strong development, and if Vestas is not willing to constantly trying to adjust its technology according to Chinese market demands, they may be threatened by new innovative technological solutions in the region (Bullard, 2020). Nevertheless, technological development has numerous opportunities, it can also be perceived as a threat. Last but not least, technological advancement is a significant element in the wind turbine industry, which has created a strong competition to have the best and most effective wind turbines, and lowest cost of renewable energy. As one of the respondents has confirmed: "*…they are quite price competitive compared to us…"* [Appendix 4]. It can be also assumed that the fierce competition might also lead to a price competition (Bullard, 2020).

d. Vestas' efforts on global projects

Vestas main purpose is to expand its presence in the renewable project market, and further invest within the renewables value chain fields. In addition, this will make Vestas creating new opportunities for value creation, while it will have the advantages to access the long - term returns made by renewable energy projects (Vestas Annual Report, 2019). Also, the value stream will include investment and

optimisation, encompassing asset management, and in this way improving Vestas' image along the energy value chain beyond the current development and investment in renewables projects. Furthermore, investment also is considered as a key milestone in Vestas' overall development plan, which involves a continuous focus on growth through project launch of a new development business across developing countries (Vestas Annual Report, 2019).

- Vestas' global project initiatives

This theme is concerned with Vestas' efforts to accelerate the global energy transition, and the company's purpose is to transfer sustainable energy into the foreign markets (Vestas Annual Report, 2019). In this line of thought, Vestas started to involve its services more directly with electrification, which is the most fundamental part to make decarbonisation possible, while increasing wind power of the energy system (Vestas Annual Report, 2019). In addition, in order to establish a sustainable energy system, electrification of transport, heating, cooling, and industrial processes is vital and Vestas is constantly trying to highlight the importance of the renewable energy transition. Also, Vestas has a great potential to prove that electrification as a significant means of addressing the climate change crisis, and its electrification is the main concern for Vestas to further implement sustainable energy solutions (Vestas Annual Report, 2019).

In addition, through its operational scope, and its technological innovations, Vestas is willing to keep pushing development of wind power, also through Danish government support (Vestas Annual Report, 2019).In other words, Vestas' global scale and operating model are crucial to driving industrialisation in the developing countries. One of Vestas' employees who gave consent to participate in this project

has stated that: "*…by setting precise settings that are gonna allow us to enter the market…so when we raise the target for renewable energy to 70% by 2030, it means that we also have a push towards the government, and we want the project to materialise…This is for any kind of energy, specifically for offshore…"* [Appendix 2]. In other words, Vestas' efforts also include raising targets which can be further supported by the Danish government, so the Danish authorities do play a significant role in Vestas' projects launch. In addition, Vestas makes a proposal about a wind turbines project and sends it to the government for approval before the government gives an incentive scheme for the pilot installation of wind turbines. Also, localisation is considered as a requirement in entering foreign markets, and local governments remain an ambition to sustain Vestas' competitiveness across the foreign markets (Vestas Annual Report, 2019). Due to its stable leadership position, Vestas is also willing to reinvest more of its profit into new and more competitive technology than any other actors in the renewables sector. As one of the respondents has stated: "*…we are willing to invest in more sustainable technology in order to be more competitive in other markets…"* [Appendix 3]. As the industry continues to invigorate, Vestas can make sustainable profits, which can be reinvested to drive innovation, and Vestas is determined to sustain its industry - leading image and investing in new technology. In this manner, Vestas is willing to maintain and expand its leadership position – for the sake of the environment and a more sustainable future (Vestas Annual Report, 2019).

Furthermore, Vestas is determined that the renewable energy sector will expand and its purpose is to dominate the market. Yet, Vestas' actions also proved that a company could not create the market alone and that there was room for others to expand as well (Wustenhagen, 2003). Moreover, other parts of Vestas' mission were also mentioned. For instance, Vestas' highlights its core values, which are the foundations of their corporate culture, "*integrity, care, the power to act, and*

development." (Wustenhagen, 2003). This proves that they are aware of the trade - off between being reliable and trustworthy actors, as well as the need to take initiative and be competitive in the marketplace. Having determined its success in the wind energy industry, global wind energy major Vestas has also announced that to trigger the installation of sustainable energy, the electrification of societies and create innovative technological opportunities, it is now also launching a new venture investment programme entitled Vestas Ventures (Vestas Annual Report, 2019). This has been revealed by one of the employees as well: "*…We have recently launched an investment programme called Vestas Venture, in order to further strengthen the company's worlds position…"* [Appendix 5], meaning that throught the launch of new projects, the company is also strengthening its international presence and competition.

"*We want to combine Vestas' 40 years of experience in pioneering renewable energy with world - class start - ups and help build solutions that will shape the energy systems of the future. We have entered a new decade of transformation and the pace of the energy transition requires new partnerships and targeted innovation efforts*", said Thomas Alsbjerg, Group Senior Vice President and Head of Corporate Strategy (Vestas Annual Report 2019).

In sum, this theme and sub – theme has presented Vestas's efforts in accelerating sustainable energy deployment through their continuous innovation process in the transfer of green technology solutions, which provides an answer to the second sub – question of this academic work. Vestas' aim is to bring sustainable energy solutions which can be perceived as means to facilitating the efforts to tackle climate change issues in the developing countries as well, in particular China. Most participants have confirmed that Vestas' efforts include raising targets for further technological development in order to be competitive in the foreign markets a well

as being supported by the Danish government to further develop global projects which the company has initiated.

e. Vestas and the Chinese market demands

By the end of 2009, Vestas had invested approximately 3.5 billion in China and its 3,000 employees are determined to supply wind energy solutions to China (Vestas China, 2020). Furthermore, Vestas is working on creating an effective value chain in China that can help with the construction of wind turbines in China. Also, recently, Vestas started improving its Chinese sourcing capabilities and its main objective is to strengthen the proportion of Chinese - made capacity (Vestas China, 2020). Also, Vestas' suppliers in China are an integral part of a partnership established to accelerate product quality and performance and allow suppliers to become more competitive in the local market. Moreover, as a global provider of wind energy, Vestas is committed to helping develop China's wind energy sector and it is further eager to share industry experience and expertise with the Chinese market (Vestas China, 2020).

As the industry provider in innovation and technology and the most experienced green energy company, Vestas is committed to use knowledge to trigger the development of a strong wind energy environment and a more sustainable China (Vestas China, 2020). Vestas is also participating in research in power systems at Tsinghua University and Xian Jiaotong. Also, the company has also helped with experience in partnerships to support the implementation of wind energy solutions into the electricity grid in China and they are trying to contribute to better understanding of finding the most appropriate location for wind turbines through a training program established with the Danish - Chinese Wind Energy Development Program. Vestas is committed to become a leader in the development of wind

energy in China in order to the benefit of China and the Chinese people. Last but not least, Vestas remains dedicated to wind energy solutions in China and to being a trustworthy parent in the Chinese government's long - term sustainable development agenda (Vestas China, 2020).

- Vestas' efforts to adjust production according to Chinese market

In order to further developing the energy output of existing and future fleets, Vestas has also launched tailor - made services adjusted to the Chinese market demands. Also, tailor - made services will be established in collaboration with Chinese customers, introducing effectiveness and flexibility (Evwind, 2014). A respondent has revealed that Vestas is working on proposing a product which is suitable for the

Chinese meteorological conditions*: "…you have to look at the wind profile of the country. China is naturally a low wind country, there are very low wind conditions, so we need to propose a product that it is going to be competitive…"* [Appendix 2]. In order to keep its leadership position and be competitive at the Chinese marketplace, Vestas is taking into consideration the specific weather conditions to launch a a new product according to Chinese standards. Also, another employee of Vestas revealed that: *"…in terms of production strategies, I believe Vestas need to source the right product for the Chinese market, and adjust to their wind conditions…"* As stated, Vestas needs to launch a new product which is suitable for the Chinese market conditions in order to remain competitive in the Chinese marketplace. Furthermore, the President of Vestas Asia Pacific & China has announced that the company is working a deeper collaboration between Vestas and China:

"*The launch of the offerings at CWP signals a more extensive and deeper collaboration between Vestas and our partners in the Chinese marke*t." Chris Beaufait, President of Vestas Asia Pacific & China said, "*By introducing our leading products and best-in-class operation and maintenance capabilities through long term partnerships in China, we can effectively support the development of wind energy in China, bringing renewable energy to millions of Chinese homes every day*."

In order to cope with the future growth opportunities, Vestas restructured its China business unit to create more agility and local presence in the peculiar Chinese market segments (Evwind, 2014). In addition, the restructuring process involves three regions covering China North, China Central and China Coastal, and new leadership. Beijing. Also, the restructuring process will provide to the three sub – regions' different business needs that include wind power purchase agreements and the particular obstacles posed in China's coastal regions (Evwind, 2014).

"*With this new organisational structure, we expect to further strengthen our position in the important Chinese market by transforming our business model to fit the new auction system*", says Juan Araluce, EVP and Chief Sales Officer.

Yet, the market with local Chinese energy companies in the green transition is assumed to be fierce due to the fact that the local companies tend to have the means in terms of capital and strong relations with local governments to initiate the projects in China and they also tend to also have full access to an fast and dynamic supply chain process (Evwind, 2014). A respondent has confirmed that local government and regulations pose challenges to Vestas implementation process: "*…so, I think it is local legislations, and regulations, Vestas also puts in a lot of effort to negotiate with the Chinese government I would say…"* [Appendix 5].

Vestas has taken further steps in the negotiation process to ease the restrictions in order to facilitate the green transition in China.

Whereas, European market solutions might be more efficient, although they may be too costly, not be able to scale fast enough or not work in a local Chinese market segment (Evwind, 2014). One of the interviewees said that: *"…we just have to compete in terms of pricing, but I think it could be just trying to understand the market a bit more. We do have a team in China that helps with a little bit of the culture…"* [Appendix 4]. Vestas employees are aware that prices of the products need to be adjusted in order to be more competitive in the Chinese market. In addition, the companies that might be able to grasp the advantages of China's green transition are the ones who utilise the opportunity to deliver green technology services and establish strategic partnerships with local key actors (Evwind, 2014).

In order to face the challenges from energy transformation, they are committed to strengthening their wind energy products, services and solutions, building on their industry - leading big data in China to introduce new digital solutions, and leveraging our unique global reach, scope and size to introduce global expertise to the China market on solution optimization, distributed wind applications, as well as service portfolios (ECSN, 2020). As a wind industry pioneer, Vestas is continuously strengthening our cutting - edge products and quality. In China, Vestas is committed to leveraging their global solution expertise and resources to help the Chinese market face the challenges from energy transformation, accelerating their efforts to reduce costs and localize our product portfolios. The Foreign Investment Law will further open up the economy and protect the legitimate interests of foreign companies. It will provide a fair and transparent market environment for players abroad, which will drive and attract more investment from foreign companies to China (China Experience, 2021).

Moreover, a world - leading company in the renewable industry, Vestas has the honor to take part in the dynamic and ongoing energy production in China (China Experience, 2021). Vestas is also committed to leveraging their green technology and service leadership achieved through years of continuous improvement to meet foreign market demands, so the company is willing to take an integral part in shaping the future of China's energy market (China Experience, 2021). Also, Vestas has always been a committed actor in the China energy market and Vestas installed China's first wind turbines and later, In 2005, Vestas increased its capacity with the largest integrated manufacturing wind energy facility in the world in Tianjin. Whereas, Vestas created its own local supply chain in China at a world - class level (China Experience, 2021). Furthermore, Vestas has signed agreements with the world's leading blade manufacturer to create innovative production lines in China supplying Asia and the global market. The respondents have also stated that China is one of Vestas' key strategic markets. Vestas is also involved in innovating their green technologies and optimizing their solutions to meet Chinese operational and maintenance strategies (China Experience, 2021).

To conclude this theme and sub – theme, we can come to the conclusion that Vestas Systems A/S is working on the adjustment of the product type in order to meet the Chinese standards and become even more competitive in the marketplace. We have also observed that some of the respondents have clearly stated that Vestas needs to adjust the prices of the green technology to be in accordance with the Chinese market segments. Additionally, most of the participants have revealed that local legislation and regulations have been considered as a burden to the implementation process of green technology and Vestas put a lot of effort in the negotiation process to ease the transfer of their green solutions to China. This theme has partially provided an answer to the main research question of this academic work, how Vestas System A/S could adjust its strategies to meet Chinese market demands. The

next paragraph will provide a final conclusion of all themes and sub – themes in this section and once again summarise the answers to the main research question and sub – questions of this dissertation.

Taking everything into consideration, we can conclude that Vestas System A/S is committed to provide green technology solutions to developing countries in order to tackle environmental challenges and establish long – term partnerships with local governments for a more sustainable future. We found that the Chinese government has taken steps on tackling environmental issues by becoming a member of the Kyoto Protocol, which is seen as an opportunity for Vestas to further expand its green technology to China. In addition, we have investigated that the Danish government is supporting Vestas in global projects and the company's main purpose is in accordance with the government's objectives to promote green technology solutions to China. We have also found that there is an emerging competition to Vestas in the Chinese market and in order to remain competitive, Vestas should adjust the prices of its products to meet the Chinese market segments. Respondents have also confirmed that Vestas is committed to the transfer of sustainable solutions in developing countries with an objective to combating climate change issues. Last but not least, it has been investigated that Vestas is currently working on the adjustment of the green technology to meet the Chinese market demands and become more competitive as well as regulate the prices of their products to remain competitive in the marketplace. However, local legislations and regulations have posed a burden to the deployment of Vestas' technology, and the company is also currently negotiating to ease the implementation process for mutual collaboration and mutual sustainable development.

5. Discussion & Conclusion

This dissertation has provided explanations in the transition towards green technology in the Chinese market, which is assumed to have a great potential for renewable energy, yet it manifests substantially diverse development patterns in terms of its deployment. This was conducted by empirically exploring theoretical perspectives on what exactly facilitates or burdens green transitions through a case study Vestas Systems A/S. This thesis has also provided a broader picture of why the transfer of green technology might be challenging for foreign companies such as Vestas Systems A/S.

The main research question and the sub - questions highlight that political facilitation of green technology will greatly help its implementation, as long as more resilient regulations and local legislations are favourable to foreign investment. The explanation observed in green technology demand in China can largely be traced back to their commitment to combating climate change issues which in turn has been perceived by foreign investment as a favourable environment to conduct business such as the Danish energy company Vestas System A/S.

Recently, China has been perceived to take major steps in making changes on the global map of the wind power industry. This thesis has explored if China's government can extend itself to the new green industries and has focused more specifically on the wind power industry. Main challenges which have been investigated by the researcher during the interviews were local regulations and

legislations which pose a burden in the transfer of green technology, yet it has also been revealed that Vestas Systems A/S is further negotiating with the Chinese government to ease the process for mutual cooperation on future sustainable development through the accumulation of green technology.

Over the last decade, Chinese energy market has expanded tremendously and new fierce competition has emerged which are in direct competition to Vestas. In addition, the company's aim is to expand its services to the Chinese market, however it has faced the government - imposed conditions which favour Chinese energy manufactures. In fact, Chinese enterprises have been able to invest quickly, obtaining a high level of producer power that has brought about fundamental changes in the international order of turbine producers. Furthermore, as mentioned earlier, Vestas is taking into consideration price regulations to meet the Chinese demands and remain competitive in their marketplace. Also, the Danish government is supporting Vestas System A/S in the materialisation of global projects and the company is furthermore raising targets for green technology innovation. Most of the respondents have revealed that Vestas is also working on developing a new product which will be suitable for the Chinese meteorological conditions keeping in mind the wind profile of the country.

The thesis has also investigated that Chinese competition to Vestas Systems A/S is starting to emerge based on Chinese producers ability to deliver low cost complemented with financial options that Western suppliers may find challenging to adjust to their market segment. Furthermore, the greatest uncertainty is whether China can implement green technology from foreign investors and if China can create business opportunities for green transformation.

We found that Vestas is currently pursuing ways to negotiate with the government to further facilitate the transition towards green transition. In fact, China and Europe can benefit from a green technology collaboration in order to minimise complexity, reduce costs, and transform wind power into a more effective energy alternative for future generations.

In addition, wind energy might nowadays be considered as the best alternative energy source, nevertheless as long as they have not clearly positioned themselves as it, there will be a room to search for alternatives. Furthermore, wind turbine producers are competing against all manufactures of alternative energy sources. Being an internationally recognised company, Vestas Systems A/S is influenced heavily by the Danish market, and also by the entire global economy. Besides that, the most recent financial crisis has redirected Vestas to shift its attention to alternative markets rather than their traditional ones. In other words, the Chinese and American markets have emerged to be the most promising countries in further investments in green technology, and a place in these market segments is also significant to remain competitive.

Furthermore, we cannot take into consideration technological developments as separate from local regulations and legislations. Also, it is evident that government regulations might undermine green technological advancement and act as vital prerequisites for any development to take place. Nevertheless, technical advancement is crucial, and it is positioned within a fundamentally governmental structure. In this line of thought, government decisions should take part in a theoretical framework which reflects the idea of green technology transfer and it arguably holds in making sense of developments within a fundamentally environmental structure. We have come to the conclusion that the Danish

government supports Vestas in terms of strengthening its global presence through wind turbine installations, incentive schemes and financial subsidies. Yet, the researcher has also investigated that the company has recently faced numerous challenges in the Chinese markets such as strict regulations, local legislation and emerging wind energy companies which are assumed to be in direct competition to Vestas. Also, the US – China trade war had a tremendous impact on Vestas production and foreign export to China. As a result of the Chinese market peculiarities, in order to remain competitive in the marketplace, Vestas is currently working on developing a new product type which is suitable for China.

As a final conclusion, this dissertation has furthermore showed the necessity for a more nuanced debate of green technology transfer in developing countries. Also, green technology solutions are essential to solving many of the current global challenges, yet for the local governments it requires the challenges to be identified and addressed accordingly to achieve mutual collaboration for a more sustainable future through green technology.

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7. Appendix

Appendix 1: Interview guide

1. How long have you been working for Vestas?

2. Could you tell me what are the company's target markets?

3. How does the Danish government support Vestas strategies?

4. Do you know how does Vestas technology implication process look like in China and are there any challenges in the implementation process?

5. How China is different compared to other markets in terms of size, prices, remuneration scheme and players involved?

6. Does Chinese society and people take climate change into consideration?

7. How could Vestas meet Chinese market demands?

Pilot interview:

Interviewer: So..before we start, I would like to inform you that your answers will be used only for academic pursues and your identity will be preserved.

Participant: Okey, thank you.

Interviewer: How long have you been working for Vestas?

Participant: I have been working for Vestas almost 5 years.

Interviewer: Could you tell me which are the company's target markets?

Participant: Vestas has presence all around the world, but our biggest markets are the US and China.

Interviewer: Do you know how does the Danish government support Vestas strategies?

Participant: As I know, the Danish government supports Vestas in green technology transition to our leading markets and of course help us with negotiation process with the respective governments. Also, there are a lot of incentive schemes that Vestas receives from the government, so we have a lot of support.

Interviewer: Do you know how Vestas implication process look like in China?

Participant: China has been tough in the recent years due to its strict policies and regulations, so we ask out government for help for the negotiation process.

Interviewer: How China is different compared to other markets?

Participant: As I said earlier, China has stricter regulation policies so if a specific product works for US it won't be appropriate for China.

Interviewer: How could Vestas meet Chinese market demands?

Participant: As I know, Vestas is looking for alternative ways to improve its production to be in line with Chinese requirements and their weather conditions as the wind there is different compared to other countries.

Interviewer: Thank you for you answers. Do you have any questions for me?

Participant: No, I don't.

Interviewer: Thank you for taking the time and I wish you a nice day!

Participant: You too.

Appendix 2:

Interviewer: So..before we start, I would like to inform you that your answers will be used only for academic pursues and your identity will be preserved.

Participant: That is fine.

Interviewer: How long have you been working for Vestas?

Participant: Three and a half years.

Interviewer: Could you also tell me what are the main objectives of the company and what are the target markets?

Participant: The main objectives of the company are to be profitable, and keep going to be the leader in sustainable energy solutions, which includes onshore wind, offshore wind, also all potential alternative solutions when it comes to delivering clean energy. The key markets for Vestas are of course China, because China is the biggest market in the world as you know, the US is the second largest market, and then we focus on the other counties as well, like Brazil, Russia, India and South Africa, so basically the whole world.

Interviewer: Could you also tell me how does the Danish government support Vestas strategies in the implementation process?

Participant: By setting precise settings that are gonna allow us to enter the market, so when we raise the target for renewable energy to 70 % by 2030 it means that we

also have a push towards the Danish government and we want the project to materialise. That it is for any kind of energy specifically for offshore for example, you have probably heard that project by 2030 the company aims to build an artificial island. That kind of mega project we cannot see without the government support. That project is also great for us – they gives us pipeline, gives us engineering targets..we are talking about very very complex projects, so this kind of very concrete examples of how the government is supporting us. On the top of that one part of it is setting up turbines but the management is really important for us because it is great to produce electricity, you cannot carry it to the end – user, so all the investment, financial investment in the infrastructure is really important for us, probably the best thing the government can do to help us.

Interviewer: Do you know how does Vestas technology implication look like in China? Are there any challenges in the implementation process?

Participant: We do not design our turbines to China, became Chinese are really good at spying, so we have a very small market share about 23 %, it is a Chinese wheel of state to give the market to Chinese consumers. 10 years ago the government so now 2020, the Chinese government said we want to have free companies the size of Vestas and produce wind turbines in China and guess what happened after 10 years, they have their own companies as the size of Vestas namely Minyan and Envision.

Interviewer: Their own Chinese companies, that are competitors of Vestas you mean.

Participant: Exactly. Today, they are mostly operating all of them in China, but Envision started to sell a bit broader, so they expand to Asia Pacific but the rest are

only for Chinese market. Chinese products are also very competitive in terms of pricing, they cover the technology very well. However, we are still ahead because we still have the engineering excellence. We are small in China in terms of commercial performance, but should have a presence in China.

Interviewer: Is the production facilities in China?

Participants: We produce Chinese turbines in China for China, also for exportation to US, India, Europe.

Interviewer: What strategies could be improved so that Vestas can meet the Chinese market demands?

Participant: Well, we have incentive scheme which the state has put so to decide if we have to focus on more foreign production, or apply another incentive scheme is comping up to support the energy industry, we are pretty reliable on incentive schemes, and energy industry is getting a lot of subsidies like most industries, but there is no market requirement. The main thing is that you have to look at the wind profile at the country. China is a naturally low wind country, there are very low wind conditions, so we need to propose a product that it is going to be competitive to catch if you want a very low.

Interviewer: The proper conditions of China.

Participant: Exactly. So that is the thing we need to work on. We have a different products but it is about sourcing the best product for the specific market. That is where we have the challenge.

Interviewer: Does Chinese society and people take climate change into consideration?

Participant: In the recent years, they do, but the country is struggling to avoid more pollution. I heard recently that Chinese government has launched its own national carbon market, so they are taking steps forward towards decarbonisation.

Interviewer: Okey, So I do not have any more questions. That is all. I will inform you about the result. Thank you for your time.

Participant: Goodbye
Interviewer: Goodbye.

Appendix 3:

Interviewer: Before we start, I would like to inform you that your answers will be used only for academic purposes and your identity will be preserved.

Participant: Okey.

Interviewer: How long have you been working for Vestas?

Participant: Soo…in total one year.

Interviewer: Okey. Could you tell me which are the company's target markets?

Participant: Soo..far..I know that Vestas do not have any specific direct marketing, but the way they operate is of course globally, but then they have divided the target markets, the first is more for mature markets and the one which is late upcoming, is not only specific, it is more of a global market. But then they know the position in each market.

Interviewer: Okey.Do you know how does the Danish government support Vestas? In what way?

Participant: I just know from my market knowledge is that Vestas is probably the leading company in terms of the transition in Denmark, so they whenever they have the main policy they usually have the Danish home companies in their, I would say in their consideration. So, I would say that is the.. I am not sure about the polices,

but I think it would have some kind of consideration before they launch any energy policy or something.

Interviewer: Okey.. So sometimes the company can also push the government to help with some global projects for example.

Participant: Yes, yes definitely. Recently Vestas did some partnership with SAP, which was a more of a mutual funding, so the are using such kind of platform to leverage their global position in the local Danish polices. The market..the total business that Vestas has three or four per cent is within local market. We are also are willing to invest in more sustainable technology in order to be more competitive in other markets.

Interviewer: Do you know how Vestas technology implication process look like in China?

Participant: The way they see China is definitely challenging and the reason being the local competition, right?

Interviewer: So..they are other competitors in China similar to Vestas?

Participant: Exactly. So, whenever they have some road map or a project, they are trying to see what competition is doing better. Because the technology which China uses is not the matching global technology, I can give you an example, the power plant, the rest of the world use solar panel or similar applications, where China want to use an open source. So, Vestas should have a separate track in term of reaching their market.

Interviewer: Okey. How China is different compared to other markets?

Participant: They have different policy on data, so you cannot download the data, so that will be a bit tricky to work on compliance level in the Chinese market. So it is…yeah…they have to have separate platform for outsourcing technology to have it for the Chinese market.

Interviewer: Aha. So, specific products which can be adjusted to the Chinese market demands. Okey so that would be actually my last question. How could Vestas meet Chinese market demands? Maybe also the conditions of China are kind of peculiar in terms of production part.

Participant: Yes. I also saw in recent exhibition that in China, of course Vestas is trying hard in terms of capturing the market but recently in Covid – 19, Vestas is out of top two.

Interviewer: Yes. These are the main challenges that the company is facing right now also.

Participant: Yes.

Interviewer: Does Chinese society and people take climate change into consideration?

Participant: Well, I know that China is the most populous country and the largest emitter of carbon dioxide. But the Chinese government has introduced a national action plan to reduce the coal consumption and improve the air quality in the long – term… so yes, I believe they are taking it more seriously.

Interviewer: I do not have any more questions. Please, let me know if you have any.

Participant: No, I do not.

Interviewer: Goodbye. Have a nice day!

Participant: Goodbye. You too!

Appendix 4:

Interviewer: Hello! Before we start, I would like to inform you that your answer will be used only for academic purses and your identity will be preserved.

Participant: Hello! That's fine.

Interviewer: How long have you been working for Vestas?

Participant: I have been working for Vestas for almost three years. I started in January, 2018.

Interviewer: Okey. Could you tell me which are the company's target markets?

Participant: We work with three regions mostly, so we have the US as one giant region and then we have Brazil, which falls under the Mediterranean region for some reasons [laughing]. What else do we have… we have Vietnam, and I would say Australia is quite upcoming, China. I will keep it to those markets for now.

Interviewer: Okey, sure. Do you know how the Danish government support Vestas strategies? The Danish government?

Participant: We work quite closely with political affairs and if there is any kind of policy that we would like to promote, then usually is someone we will reach other. We have a set of questions for them and then the ambassadors will help us ask the different authorities that we are interested in. Also, the government is trying to regulate the prices when it comes to export.

Interviewer: So, are there any specific project you ask the ambassador for example to help out with?

Participant: Yes. There are few project that we are launching in China and the government has been supportive in terms of pushing this project forward. We have also proposed the Danish government to helped us with future project in regard to financing big projects in the near future.

Interviewer: Do you know how does Vestas strategy implementation look like in China?

Participant: We have presence in China for a really long time and China is one of our biggest markets. One of the biggest challenges we face with China is that they have launched their own energy company which is in direct competition with Vestas.

Interviewer: Do you know how China is different compared to other markets in terms of size, players involved like US and Australia as you mentioned before.

Participant: When we publish our results, the Chinese market changes our outlook on where we rank globally, Vestas position is not number one in the Chinese market. In term of schemes, I think they have moved to option based just like the rest of the world, but it's a bit high to compete price wise, because there many other factors, that if I recall correctly the government have initiated instalments, so it's all about how much you have installed in the quality but in terms of materials they don't really, they don't let anything like steel or any commodore they are quite price competitive compared to us.

Interviewer: Okey. Do you mean that also home based Chinese companies that are in competition to Vestas?

Participant: We usually, try to offer a lot of solutions, so we can help them optimise this, we can help them getting good service contact, we can help balancing the system, but they don't really need that they have their own resources.

Interviewer: I understand. Okey. So, my last questions would be how Vestas could improve its strategies to meet Chinese market demands?

Participant: That's a really good questions. I don't have the solution on the top of my head. I would say, we can you know, we just have to find a way to compete in terms of pricing, but I think it could be just trying to understand the market a bit more. We do have a team in China that helps us with a little bit of the culture and a little bit of the how are the right people to talk to.

Interviewer: So, what about the local regulations that for example Vestas have to deal it and push forward the implementation process?

Participant: Yes.

Interviewer: Does Chinese society and people take climate change into consideration?

Participant: As far as I know, when the Kyoto Protocol entered into force, has become a member of it. So, yes China is making some efforts in the climate change action plan.

Interviewer: Okey. Okey. Thank you for taking the time and I wish a nice day!

Participant: Thank you, you too

Interviewer: Goodbye.

Participant: Goodbye.

Appendix 5:

Interviewer: Hello! Before we start, I would like to inform you that your answers will be used only for academic purposes and your identity will be preserved.

Participant: Hello. Okey, good.

Interviewer: How long have you been working for Vestas?

Participant: I have been working for five years and two months right now.

Interviewer: Could you tell me which are the company's target markets?

Participant: One of the most developed market is Northern Europe, they have solutions there for quite many years. But target markets is something we would like to work on projects with China, Brazil, US, there is a lot of potential but not that much developed yet.

Interviewer: So, is China considered as an emerging market for Vestas? Not mature market?

Participant: Yes, that's right.

Interviewer: Good. Do you know how does the Danish government support Vestas strategies?

Participant: Particularly Vestas, there are a lot of programmes, you can see sustainability programs that are..which are in line with the Paris Agreement. I think they have some target that Vestas need to fulfil to keep reducing the level of carbon dioxide and sustainability ambitions and something like that. We have recently launched an investment programme called Vestas Venture, in order to further strengthen the company's worlds position.

Interviewer: Okey. Do you know how Vestas technology implication look like in China? Does Vestas as a company face any challenges in the implementation process in terms of local regulations?

Participant: Yes, it is very different with a lot of restrictions in regard to confidentiality, so they have as I know, they have one of the main restrictions in production, they don't use the products for America, Chinese cannot utilise, like serves and equipment, everything that is UV, windows, CISCO, so they are looking for new suppliers or some local ones that they could produce. So this requires that all the systems are adapted to their market.

Interviewer: Okey. So, these are the challenges.

Participant: There are a lot of negotiations, because these are negotiations directly with the government, even other companies or physical people.

Interviewer: Do you know how China is different compared to other markets, in terms of size, prices, schemes and players involved?

Participant: There are a lot of players that are coming there which could be new but have a big potential because they are very flexible.

Interviewer: How could Vestas meet Chinese market demands in general? What strategies Vestas can improve to be more competitive?

Participant: They have people that can work there, they know the language better, the culture, so I think is local legislations, regulations. Vestas also puts a lot of effort to negotiate with the Chinese government I would say.

Interviewer: Does Chinese society and people take climate change into consideration?

Participant: I do not know much about it, but I have read that the president of China has announced that China will strengthen its climate change target and will

aim to achieve a carbon neutral solution, but I know that China is still depending on the coal industry, so there is so much to be done before it becomes carbon neutral…

Interviewer: Okey. I don't have any more questions. Do you have any questions for me?

Participant: No, I don't.

Interviewer: Okey then. Thank you for taking the time. I wish you a great day!

Participant: Thank you. You too.

Interviewer: Goodbye.

Participant: Goodbye.

Appendix 6:

Interviewer: Hello! So before we start, I would like to inform you that your answers will be used only for academic purposes and your identity will be preserved.

Participant: Hello! Okey, thank you.

Interviewer: How long have you been working for Vestas?

Participant: I have been working for Vestas six years and a half.

Interviewer: Could you tell me what are the main objectives of Vestas and what are the target markets?

Participant: One of the main objectives of Vestas is to become a leader of providing sustainable energy and the main markets for Vestas are US and China of which China is considered the main market for our product export. China is also considered as an emerging market for Vestas.

Interviewer: Could you tell me how does the Danish government support Vestas strategies in the implementation process?

Participant: Yes. So, the Danish government is supporting Vestas in terms of financial schemes, projects we would like to initiate in the near future and also pricing regulation. Also, in terms of infrastructure, we push the government to provide us with subsidises since implementation of infrastructure is vital for us.

Interviewer: Do you know how does Vestas technology implementation look like in China? Are there any challenges in the implementation process?

Participant: Yes, we have a fully supply chain presence in China, and also factories in China are close to suppliers. Also, Chinese factories supply of Vestas is supplying other regions. China is a colossal market for wind power and we have installed wind power capacity on 2018 around 23.000 which is three times higher than in the USA. But, the market is dominated by local players. There are a lot of challenges such as domestic laws in China and Chinese production advantage turned complicated for wind turbine manatee in 2018 when US – Chinese trade war started which means that harsh tariffs on Vestas export to China made it challenging, which as a result there was a big threat to Vestas global supply chain. Tariffs had a ripple effect on other countries and hits other markets which also in turn put pressure on Vestas profit, there is also an increase of transportation costs, in fact, the whole global supply chain process was affected.

Interviewer: What strategies could be improved, so that Vestas can meet Chinese market demands?

Participant: For now transportation cost is a major consideration for Chinese market. It is usually cheaper to have the manufacturer closer and I think Vestas will not relocate production out of China and it will take advantage of localisation of wind power production. Also, in terms of production strategies, I believe Vestas

need to source the right product for the Chinese market, and adjust to their wind conditions.

Interviewer: Does Chinese society and people take climate change into consideration?

Participant: Yes, they do. I think the government is trying to position itself as an international leader in combating climate change and the most recent survey proved that the public supports the government's action on that matter.

Interviewer: Ok. That was my last questions. Do you have any questions for me?

Participant: No, I don't.

Interviewer: Ok, then. Have a nice day. Thank you for taking the time!

Participant: Thank you..you too!

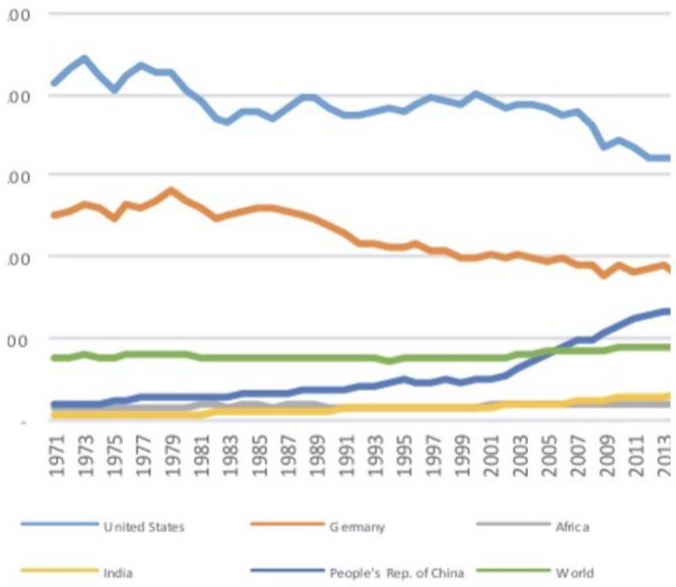

Figure 1. Changes in per capita carbon dioxide emissions in selected countries and regions, 1971 – 2015 (metric tones). Source: (Jiahua Pan, 2018); https://press-files.anu.edu.au/downloads/press/n4267/html/ch26.xhtml?referer=&page=37.

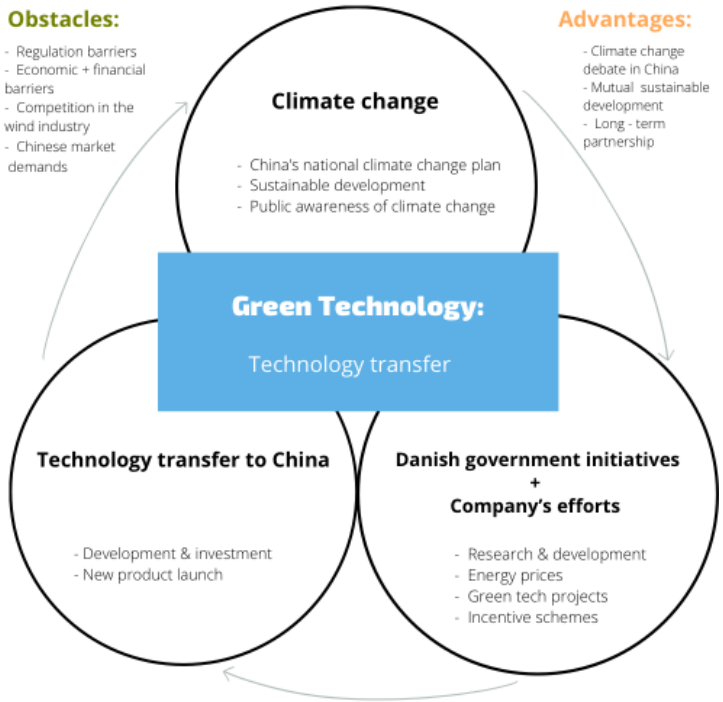

Figure 2. Green technology: Technology transfer; Climate Change; Danish government initiatives and company's efforts; Technology transfer to China;