



**LAUREA**  
UNIVERSITY OF APPLIED SCIENCES

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# Greening up China

a study on Finnish cleantech entering the Chinese market

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## Exporting to China

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### Greening up China

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The purpose of this study is to examine the Chinese market and the potential it presents for Finnish cleantech businesses. The study sets out to investigate cleantech, to analyze the strength of Finnish cleantech companies against potential Chinese rivals, and to examine the benefits of entering the Chinese market and evaluating if they outweigh the potential risks of the venture.

The Finnish economy has been experiencing a deep recession due to several negative impacts especially influencing the rate of exports, such as the fall of the mobile communications giant Nokia and the pulp and paper industry. The Finnish balance of trade experienced a record low trade deficit in 2012 and the national debt is increasing annually. Finland is currently experiencing a need of growth especially in the export sector and new industries to rectify the negative development of the economy. Cleantech is a relatively new industry that has been considered as a potential new cornerstone for the Finnish economy due to Finland's history in excelling at sustainable energy production, systems and solutions, as well as minimizing the environmental impact in industrial activities.

The research has been conducted as a qualitative study consisting of documentary analysis, observations and informal interviews conducted by the author of the research, as the field is relatively new and information, especially from the Chinese market is limited. News articles on the development of the industry and the Chinese economy were used extensively as secondary data in order to support the author's research and to forecast future developments in the Chinese market.

According to the authors secondary data analysis and the market value calculation, the Chinese market holds growth potential for the Finnish cleantech sector to counteract the drop in exports after the recent. The main threats for Finnish cleantech lie in slow market entry and potential policy changes that can alter the market situation into hostile, however it is currently extremely unlikely due to the need for solution in the Chinese environmental crisis.

Key words: China, Finland, cleantech, exports

Roni Virtanen

### Greening up China

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Opinnäytetyön tavoitteena on tutkia Kiinan markkinoiden potentiaalia suomalaisille cleantech yrityksille. Tutkimus lähtee selvittämään cleantech alaa, sekä analysoimaan suomen vahvuuden cleantech alalla mahdollisia Kiinalaia kilpailijoita vastaan, sekä selvittämään kiinan markkinoille levittäytymisen kannattavuutta vertaamalla mahdollisesti saavutettavia hyötyjä potentiaalisiin riskeihin.

Suomen talous on ollut syvässä lamassa lukuisten negatiivisten vaikutusten vuoksi, kuten Nokian sekä metsä- ja paperiteollisuuden alastulon vuoksi. Suomen vaihtotase saavutti kaikkien aikojen pohjan vuonna 2012 ja julkinen velka kasvaa vuosittain. Suomi on uusien aluevaltausten ja vientimahdollisuuksien tarpeessa korjatakseen talouden kehityssuunnan kasvu-uralle. Cleantech on ala jonka on arvioitu mahdollisesti omaavan potentiaalia kasvamaan uudeksi kulmakiveksi Suomen taloudelle, Suomen historian ja osaamisen vuoksi vihreän energian, ympäristöystävällisten vaihtoehtojen ja kestävän kehityksen parissa.

Tutkimus on toteutettu kvalitatiivisena tutkimuksena ja on tukeutunut dokumentti analyysiin, tekijän havainnointiin, sekä informaalisiin haastatteluihin paikallisten kanssa, alan uutuuden ja tiedon heikon saatavuuden vuoksi, etenkin Kiinan markkinaan liittyen, on erittäin rajoitetusti. Uutis-artikkelit alaan, sen kehitykseen ja Kiinaan liittyen olivat olivat laajasti käytettynä toissijaisena toissijaisena tietojenkeruu metodina tukemassa tekijän tutkimusta, sekä alan ennusteissa Kiinaa koskien.

Tutkijan toissijaisen tiedonkeruun analyysin ja markkina arvon laskelmien mukaan Kiinan markkinat omaavat kasvupotentiaalia suomalaiselle cleantech teollisuudelle kasvaa uudeksi peruspilariksi, korvaamaan Nokian ja paperiteollisuuden jättämää tyhjiötä. Suurimmat uhat ovat suomalaisten cleantech yritysten hidas Kiinan markkinoille siirtyminen, sekä mahdolliset poliittiset muutokset jotka kääntäisivät Kiinan markkinat vihamielisiksi ulkomaisille cleantech toimijoille, jonka todennäköisyys on nykyisen tilanteen valossa erittäin epäneköistä Kiinan ympäristö-ongelman korjaamisen vaatavuuden vuoksi.

Keywords: Kiina, Suomi, cleantech, vienti

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## 1 Introduction

The Finnish economy has been suffering greatly due to the decline of its core forest industry and the fall of the mobile communications giant Nokia and new exports and new markets are essential for the economic growth of Finland. Major growth in the global economy is found in the developing markets and due to the authors' personal connections, experience and know-how about China and the Chinese market this topic has been chosen.

The objective of the thesis is to study the exports from Finland to China to examine the possibility for improvement and find opportunities to support small and medium sized enterprises attempts at an entry to the Chinese market.

Major limitations are caused by information languages being limited to English and Finnish language, eliminating information provided in both Mandarin and Cantonese Chinese languages, which are used in the People's Republic of China where the topic research is centered. The rapid development in the Chinese economy also causes limitations, due to information being quickly outdated due to the fast-paced changes in the Chinese market. This is especially present in the sources of information as the main channel of information is e-format information found online, due to printed information including, but not limited to books are mostly very inaccurate due to the information often being outdated already at the time it is first printed.

Research methods chosen for the research will be documentary analysis and the author used observation and informal interviews as data collection methods in China

## 2 Finland & it's economy

This chapter introduces Finland, its economy, overall exports and the portion directed to the Chinese market to establish a general image of the economic situation and aid in examining the potential for new growth possibilities later in the research.

### 2.1 Introduction of Finland

Finland is a sparsely populated (15.7 per square kilometer) north European country with a population of 5.4 million people with 67 % of the population living in the urban areas (including the Helsinki metropolitan area with 1.25 million inhabitants) and 33 % in rural areas across the country. (Doing Business in Finland 2012, 4)

## 2.2 Finnish business environment

### GDP (PPP) per capita (int'l \$), 1990–2012

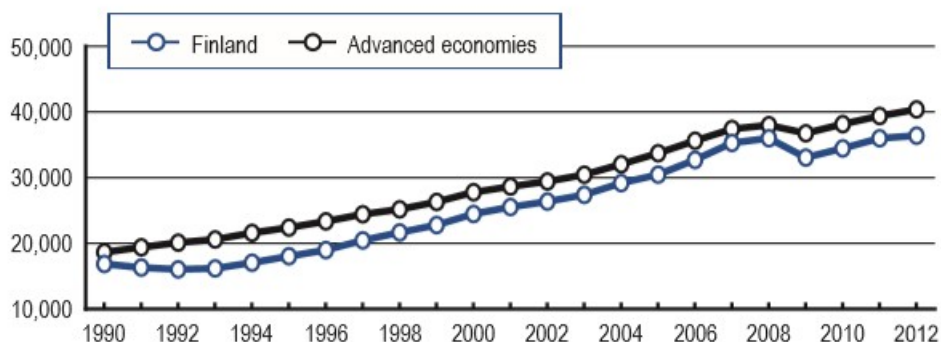


Figure 1: GDP (PPP) Finland (Schwab & Sala-i-Martin 2013, 200)

The Finnish economy has experienced a decade of rapid growth after the recession in early 1990 as presented in the figure above. The financial crisis and the impact of the collapse on Nokia can be noted in the significant reduction of GDP in 2008-2009, which had more than average impact on the Finnish economy in comparison to the advanced economies in general. The Finnish economy has experienced a state of recession and as a result reached a record low of 795 million euro trade deficit in the balance of trade in the year 2012, and thus is in need of new opportunities for growth in the export sector for the economy. (TradingEconomics 2015)

TABLE 1

#### Key economic indicators

Gross Domestic Product (GDP) 2012
EUR 192.50 billion
GDP per capita 2012 EUR 35,571
Unemployment rate 2012 7.3%
Inflation rate 2012 2.8 %
Enterprises 2011 322,232
Enterprises established 2012 31,186
Enterprise closed 2012 25,504
General government deficit 2012 1.9 % of GDP
General government debt 2012 53.0% of GDP

Table 1: Key economic indicators (UHY international 2013)

As presented Finland holds a relatively high GDP of 35,571 per capita in 2012 according to the data by UHY international, which is same level of for example France and United Kingdom.

The key number is the government deficit which has also been increasing steadily after 2012, expected to rise to a 3.3 % this year. Due to the deficit issue and public debt forecasted to reach 62.6 % in 2015, the Finnish economy experiencing a continuing recession is facing a risk fines from the European Union if improvement is not created. (YLE 2015)

When reviewing the key economic indicators and comparing them to the 2015 information noticing the general government deficit has increased more than 50 % and the increase of public debt from 53 % in 2012 to forecasted 62.6 % it can be claimed, that the Finnish economy is considerable economic distress and requires growth in new sectors, which this research aims to support

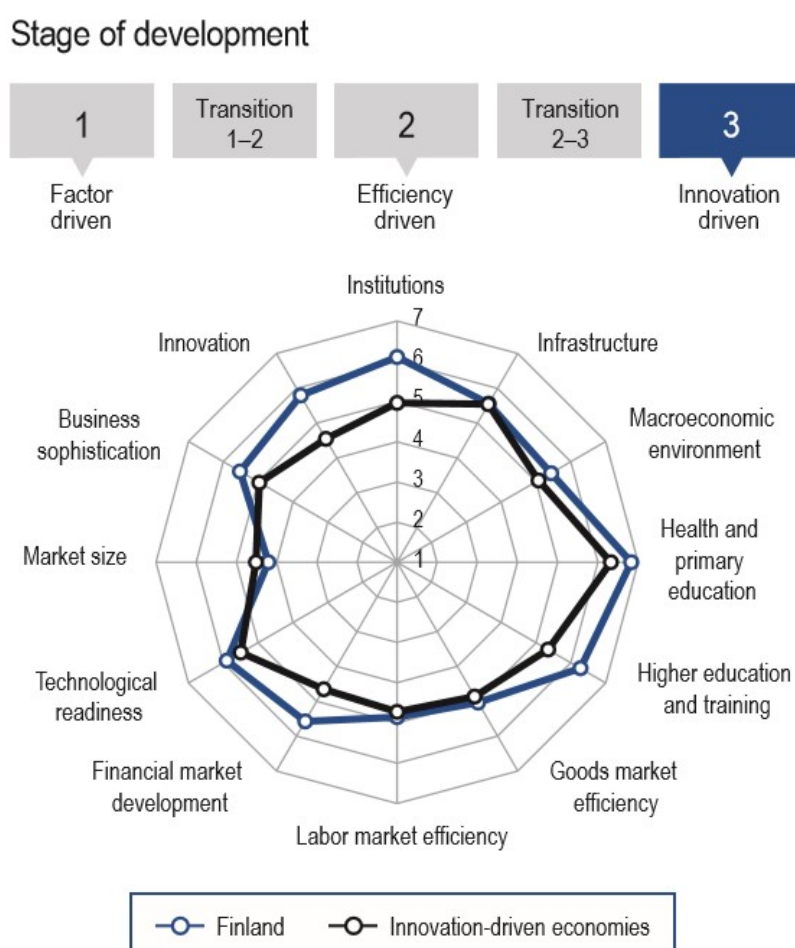


Figure 2: Stage of Development (Schwab & Sala-i-Martin 2013,200)

The Finnish economy is characterized by its focus on innovation, education, research and development, which is clear in the figure where Finland is compared to other innovation driven economies and its ranking in the Global Competitiveness Index in which Finland was ranked 1<sup>st</sup>

in higher education and training for the quality and effectiveness of its renowned education system, the transparent Finnish institutions and innovation, which is much believe to be in direct correlation to the education efforts in the past decades that have led to a highly educated and skilled workforce out of 148 compared countries. Schwab & Sala-i-Martin continue in their study to mention the high quality healthcare leading to a top position in their study. (Schwab & Sala-i-Martin 2013, 200) (Schwab & Sala-i-Martin 2013, 11)

### 2.2.1 PESTLE analysis of Finland

PESTLE analysis is an extended analysis of PEST used similar to that of the SWOT, but instead of a business or its industry it is used to measure a state and the effects it will and might have for the business. PEST stands for Political, Economic, Social and Technological, PESTLE is a newer extended version of the PEST adding Legal and Environmental factors in to the analysis, PEST together with SWOT analysis is often a strongly suggested tool used to better understand the business environment. (Constantinides 2013)

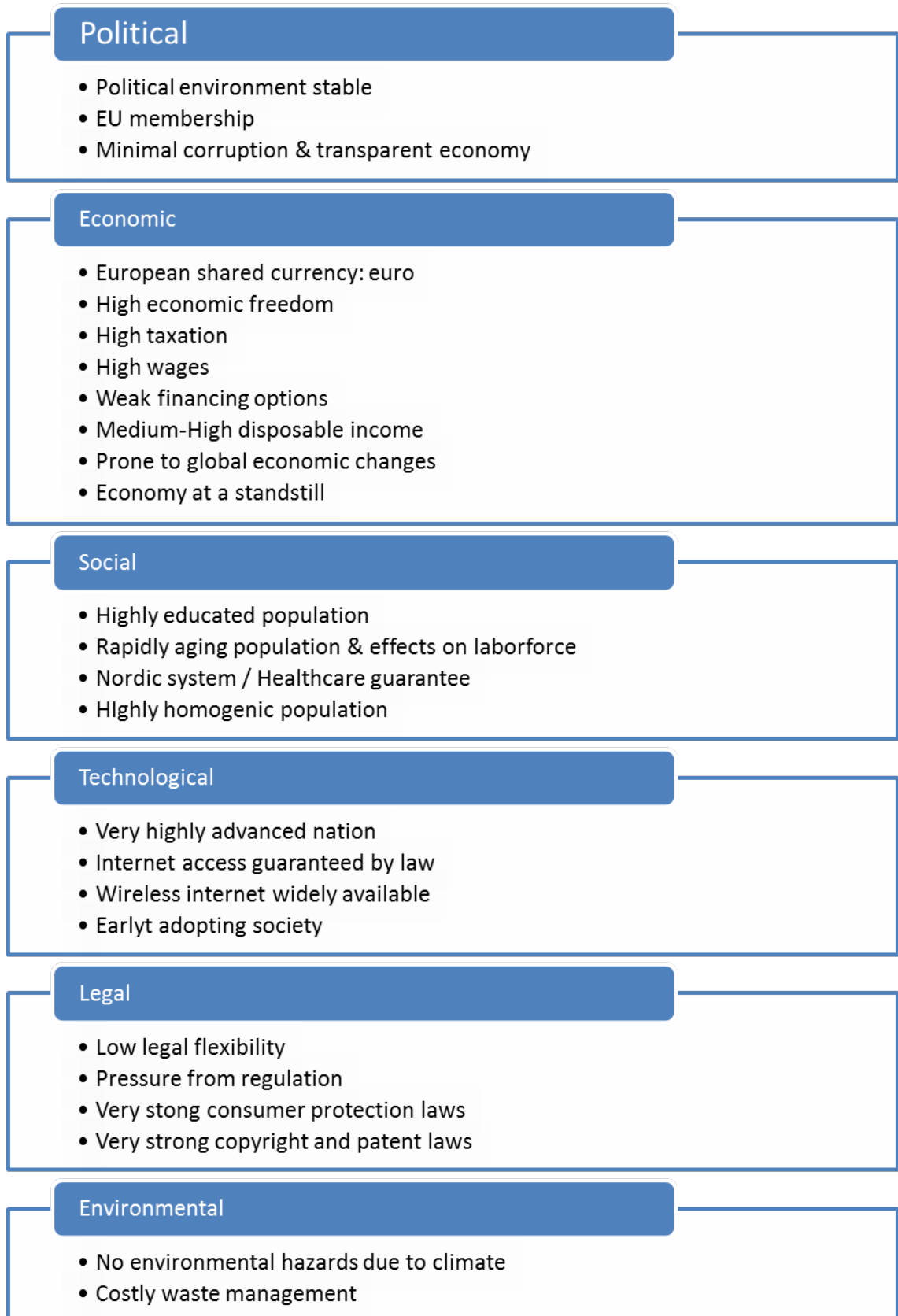


Figure 3: PESTLE analysis of Finland (Edited on basis of information by: Schwab & Sala-i-Martin 2013, UHY international 2013)

Using PESTLE analysing tool the political factors can be seen overall as positive factors and Finland such as the lack of corruption and the stability of the government supported by consecutively ranked last on the failed states index provided for 2010-2013 by the The Fund For Peace. Finland is an EU member and political atmosphere can be changed by national and EU political changes. Finland is rated as 3<sup>rd</sup> least corrupt nation in the world after tied Denmark and New Zealand in the Corruption Perception Index 2013 by Transparency International.

The economic factors pose the most significant problems Finland has for entrepreneurs and businesses according to the global competitiveness report of 2013-2014. The global competitiveness report includes a study of what are seen as the most problematic issues in the nations economies studied in the report, the respondents had to answer 1-5 to the questions listed below (the answers have been weighted).

#### The most problematic factors for doing business

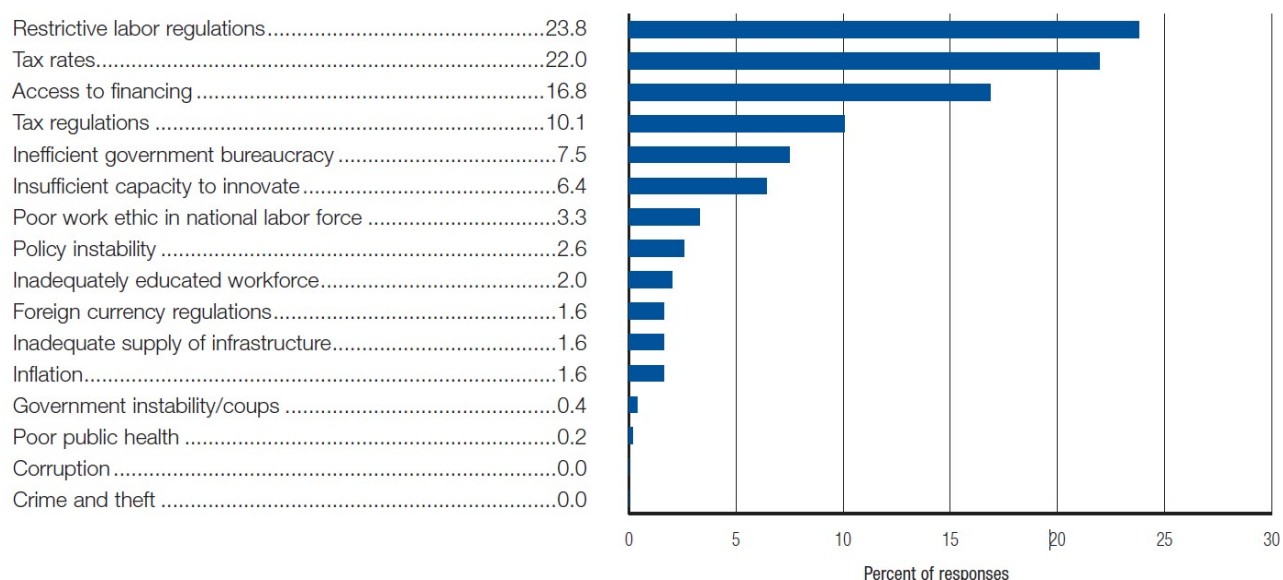


Figure 4: The most problematic factors for doing business (Schwab & Salai-Martin 2013, 200)

Based on the research by Schwab and Sala-i-Martin in the Global Competitiveness Report they present the list of the most problematic factors for doing business in Finland, in which the respondents have rated the restrictive labor regulations, tax rates and access to financing as the top issues.

Restrictive labor regulations and tax issues can both be interpreted as issues relating to the cost of production in the country, while access to financing creates the issue in process development.

A Positive notion to their study is, that issues related to skills and access to necessary work-

force are either non-existent, or minor issues according to the study, which indicates that companies need not expect major issues with lack of skilled workforce if possible production expansion can be created.

### 2.3 Finnish exports

In this part of the research the Finnish exports are examined, the categories and their values are being reviewed for establishing core understanding of the Finnish export industry.

Finland is an export driven economy with its exports accounting for 38 % of the GDP of \$195,5 billion USD. (CIA 2014, 9) The exports are 73 % goods and products and the remaining 27 % are services. (EK 2015) The main exports include electronic and industrial components and machinery, transport equipment, chemicals and the more traditional Finnish products such as timber and other pulp and paper products, as well as basic metals. (CIA 2014, 9)

Below are provided the euro (€) value of the main export groups in Finland. The China-targeted exports and their values are reviewed further in the research to examine possible differences. According to the information provided by Tilastokeskus main exports from Finland in 2014 based on the European CPA 2008 classification system are as follows:

Exports	€ million	%
Chemical industry products	12 875	23,0
Forest industry products	11 188	20,0
Metal and metal products	8 081	14,4
Machinery and equipment	7 196	12,9
Electric and electronics industry products	6 742	12,0
Other	9 892	17,7

Table 2. Exports (Tilastokeskus 2015)

Judging from the largest export groups according to the information by Tilastokeskus it is clear that industrial high technology equipment is a significant part of the Finnish exports , which is a clear indication of the high technology focus of the Finnish economy and society.

The top trade partners for Finland in 2014 based on exports are Germany 12,0 %, Sweden 11,1 % and Russia 8,3 %. (Tilastokeskus 2015)

a Notion of importance is the reduction of exports to Russia which was the largest importer from Finland since 2007 until 2014, when Sweden and Germany rose above. The decrease in exports to Russia started in 2013 influenced by the reduction in the price of raw oil, com-

bined with the effects of the trade embargoes set by US and the EU. The exports have continued to drop and were another 35 % less in January-May 2015 compared to January-May 2014 dropping Russia to the fifth largest export destination below the United States of America and the Netherlands. (Taloussanommat 2015)

#### 2.4 Trade with China

Trading with China has been through the years running at a deficit for Finland and is the second largest trade deficit partner after Russia. The trade deficit to China was almost 2 billion euro in 2012, 913 million euro in 2013 and a 1,1 billion euro deficit for 2014 but as the largest market in the world it holds large potential for growth in exports that has not yet been fully utilized. (Customs 2014) (Tilastokeskus 2015)

Based on total trade China is 5<sup>th</sup> largest trade partner to Finland in 2014 with exports of 3,7 billion euro and 2,6 billion euro worth of imports according to Tilastokeskus statistics.

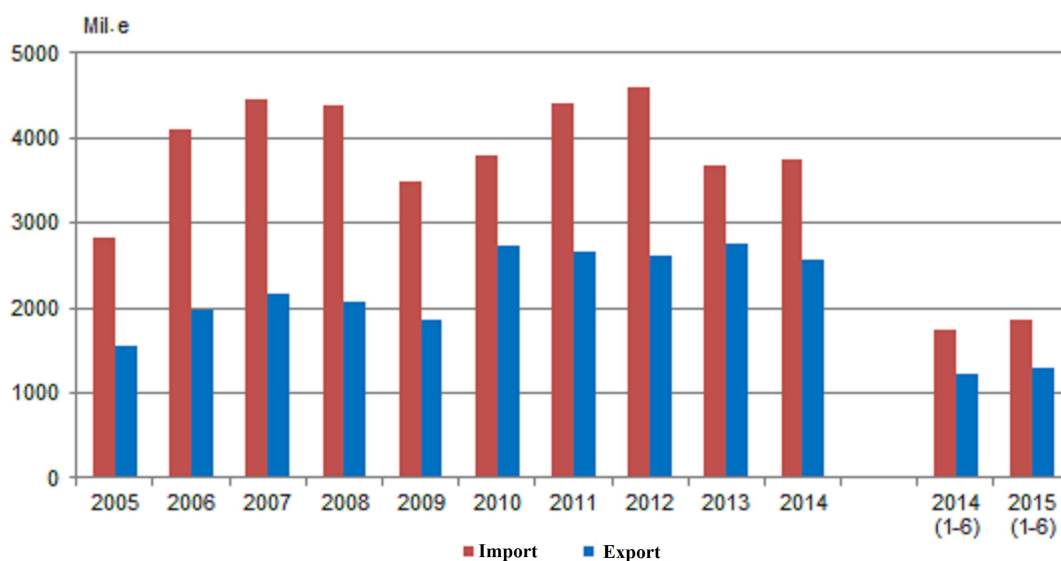


Figure 5: Finland - China trade 2005 - 2015 (Tulli 2015)

Above we can see the data of development for trade between Finland and China from 2005 to 2015. It is clear to see the direction of trade is stable growth, however when considering the size of the Chinese economy and the considerable gap between imports and exports it can be claimed, that the potential in the Chinese trade has not been successfully utilized. It is positive for the Finnish economy to notice that the exports to China have experienced significant growth in 2010, which appears based on the statistics to have since been quite stagnant with limited fluctuation.

### 3 China & it's economy

This chapter introduces China, its economy and examines the risks and benefits of entering the Chinese market, as well as aims at finding the obstacles for entering the market and finding potential solutions to those obstacles.

#### 3.1 Introduction of China

China is one of the oldest civilizations on the planet tracing back to 1500-3000 BC based on different estimates. China experienced major civil unrest which led to several revolutions, as well as famines and occupations during the 18<sup>th</sup> and 19<sup>th</sup> century which were generally known as century of humiliation. The current People's Republic of China was founded by Mao Zedong in 1949 and mostly closed off the country until the changes by his predecessor Deng Xiaoping starting in 1978. The changes beginning in 1978 have been mainly focusing on creating and developing an open market, which while the communist party still possesses major control over has been gradually opening up for privatization and increasing foreign accessibility until the current date. (CIA 2015)

Since December 4 of 2014 China is the world's largest economy according to IMF (International Monetary Fund) when its GDP was just one third of that of the United States as reported by MarketWatch, as well as the most populated nation in the world with a population estimate of 1,37 billion people, meaning out of all the people on the planet almost 1 out of 5 is Chinese. (CIA 2015)

#### 3.2 The Chinese economy

"The rapid rise of China as a major economic power within a time span of about three decades is often described by analysts as one of the greatest economic success stories in modern times." (Morrison, W. 2015, 5) Since the economic reforms of 1978 that opened up the market that had been closed up according to traditional closed market system followed by communist nations, China has been experiencing continuous rapid economical development. (Morrison, W. 2015, 5)

**Chinese and U.S. GDP on a PPP Basis: 1980-2014**  
(\$ trillions)

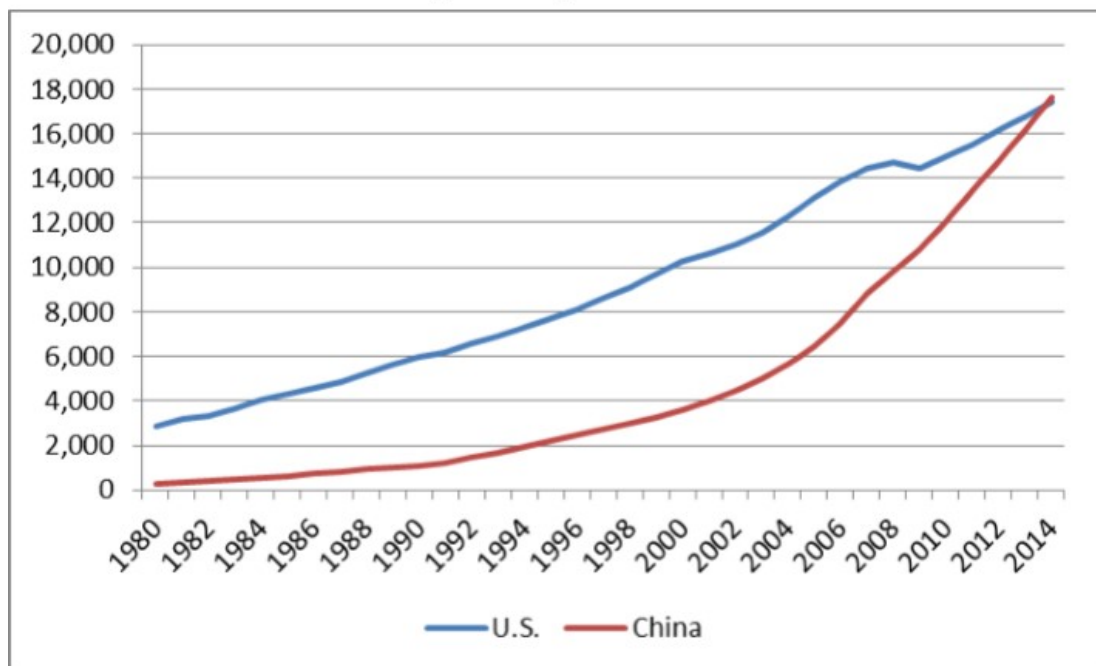


Figure 6: GDP growth of China 1980-2014. (Morrison 2015, 8)

The Chinese Gross Domestic Product has been growing at an average above 10 % rate since the economic reforms began to take effect in 1979 until 2014 when it surpassed the United States as the largest economy in the world based on purchasing power parity (PPP) adjusted gross domestic product (GDP). (Morrison 2015, 5)

The 2008 global financial crisis also took significant effect in China, which was especially present in the Chinese export sector. Since the beginning of the effect of the economic reforms in 1979 up till 2007 China had experienced real GDP growth of around 10 % which in 2007 was at 14,7 %, but experienced significant slowdown due to the financial crisis reducing the GDP growth in 2008 to 9,6 % and continued to slow down to 9,2 % in 2009. (Morrison 2015, 2)

The Chinese economy works on a very high pace which is both praised, and criticized as problems and issues are responded typically quickly after their recognition, but businesses can experience significant pressure from significant political changes made and taking effect very quickly after introduction. The author presents the upcoming drafted “governing foreign NGOs “ law, which requires foreign non-governmental organizations, universities and business groups to find an official sponsor, which typically means a government-backed and/or operated agency to continue operations.

This draft has been widely recognized by these foreign NGOs to force them out of the market. (Wee, S. Martina, M. Pomfret, J. 2015.)

### 3.2.1 'Social business'

Quanxi (关系) or 'social business' is a core part of Chinese business culture and needs to be understood in order to be successful in the Chinese market. China is a high context culture, opposed to Finland being a low context culture and quanxi is an example of that difference. "In high-context communication, the message cannot be understood without a great deal of background information. Low-context communication spells out more of the information explicitly in the message. Let's suppose I would like to drink some Löwenbräu Original beer with 5.2% alcohol content by volume. If I order it online, I specify all these details. This is low-context communication. If I am sitting in a Munich Biergarten, it may be enough to say, "Noch eins, bitte" ("Another one, please"). The waiter knows that I just drank a stein of Löwenbräu Original, or that customers who speak with a foreign accent nearly always want the city's most famous beer. Because my remark is meaningful only in context, it is an example of high-context communication." (Hooker 2008, 1)

## 4 Focus industry

In this part of the research the choice of the focus industry in the research and the reasons behind the choice are presented and introduced.

### 4.1 Choosing a focus industry: Cleantech

The industry focus chosen for the research is cleantech. The author of this research has concluded on the basis of the information gathered, that the potential for growth in cleantech in China is counted in billions of euros giving potential for becoming a major part of the entire Finnish GDP. Finland is also a forerunner in cleantech research and development giving Finland a competitive advantage over many competitors. (FinPro 2013)

Cleantech industry is also significantly connected to Facility Management industry, in which the author can use his special knowledge gathered during studies in the field of Facility Management and business oriented studies.

### 4.2 Cleantech. What it really is?

Cleantech is a relatively new term short for clean technology and it's definition varies based on the source as it has not been standardized. In general cleantech refers to green sustainable and clean technology solutions such as renewable energy, "green" building meaning building that emphasizes on renewable material and low emission production, energy efficiency,

environmental protection systems and solutions, and overall ideas, systems and solutions that are focused on minimizing emissions and maximizing sustainability for a green and clean result. (Cleantechalliance)

#### 4.3 Cleantech in China

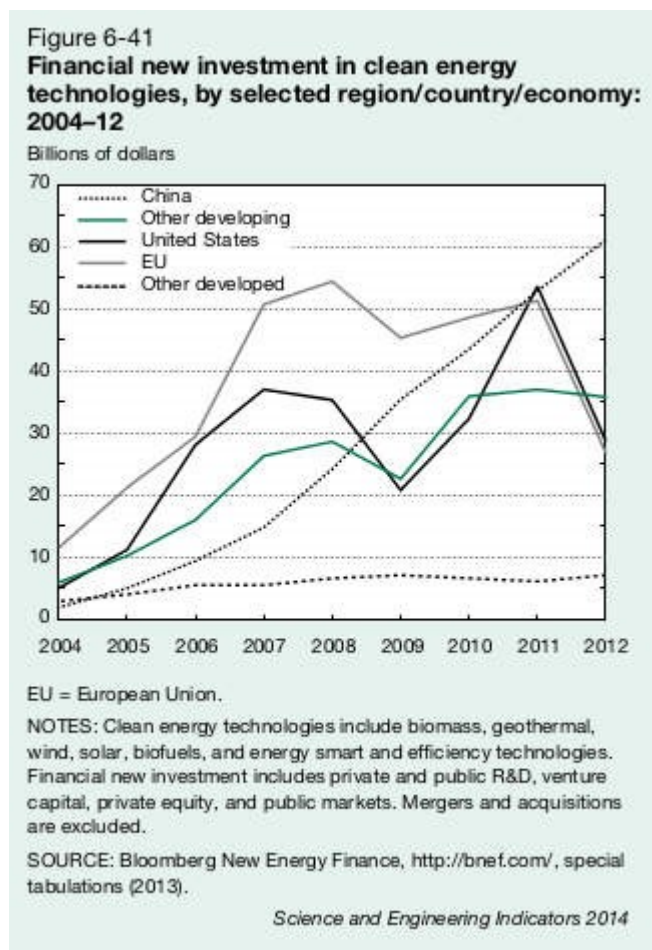


Figure 7: China cleantech investments (Tweed 2014)

China has made significant investments in the development of cleantech solutions, most notably solar power and other clean energy. As presented in the figure by Katherine Tweed of GreentechMedia, China surpassed the United States and EU in the investments to clean energy in 2011, and the investments have experienced constant significant growth through the entire timescale presented in the figure from 2004 to 2014 and is expected to continue and was reported at 60 billion US dollars in 2012, more than a third of the entire world's investments in clean energy, compared to 29 billion US dollars by EU, and 27 billion US dollars by the United States. (Tweed 2014)

Chinese cleantech was claimed to have begun in 2002-2003 and the solar power boom in Europe beginning in 2005-2006 starting a major growth period in China to match the demand

in Europe for the cleantech industry and especially clean energy solutions. The clean energy sector in China is said to have experienced 'phase 2' growth starting in 2012 to respond to the pollution issue experienced in China, recognized in the Chinese government and prioritized in the most recent 5 year plan of 2011. (Zhang 2013)

## 5 Methodology

This chapter describes the methods used to acquire information on the need for cleantech and forecast the possible growth in the need for cleantech.

Methods used to acquire information were heavily relied on observation and informal discussions with Chinese locals. Informal discussions and observations happened between September 2011 and June 2012 in Shanghai, China and November 2014 to March 2015 in Anyang, Henan, China. Cleantech is a relatively new industry and information and development of cleantech is mostly unavailable in China. Observations and informal interviews with residents were chosen to judge the demand and forecast the growth of demand for cleantech in response to public demand for actions against the pollution issue.

Other decisions behind the chosen methods lie in the political decision-making in China, which is heavily focused in their 5-year plan system and political decision making is done on a 'closed doors' principle, leading to the situation where information is limited and mostly unavailable to the public and decisions might receive very little explanations outside the political leadership. Chinese politics and central policy decisions greatly influence the Chinese economy in a time-scale that can be considered utopistic in a western system, where political changes might take years to take effect in the business sector.

The author also used documentary analysis, significantly based on articles by media and organizations related to the cleantech industry. Documentary analysis is a qualitative social research method, an analysis based on documentation including, but not restricted to news articles, biographies, public records and different kinds of plans by public organizations. The documentary analysis is conducted by reviewing and analyzing the documentation relating to the field of study, and in simplified terms a documentary analysis is reading high amounts of written material related to the topic. (Heffernan, C. N.D.)

## 6 Exporting cleantech to China

This chapter presents the researchers studies and findings in the need for cleantech in China, the risks and potential for entering the Chinese market and aims to create a know-how basis for avoiding barriers and cultural misunderstandings.

As observed by the author between 2011 and 2012 the main concerns with the Chinese locals based on informal interviews lied in corruption, pollution, food safety and freedom of speech. According to the author's informal interviews and observations of 2014 and 2015 found that these issues had not changed and were still the main concerns in the public.

The central committee is known to often make decisions based on the general issues and worries amongst the general population, as the most important factor for Chinese politics is the preservation of stability. As an example of the 'public-demand politics-supply' cause and effect chain is the large-scale anti-corruption war started in response to public demand in 2013 by Xi Jinping as he took office.

Based on the informal discussions with Chinese locals the distress for the increasing widespread pollution problem in China was clear. In response to the pollution problems, Chinas ex-Premier Wen Jiabao identified the pollution and climate change issues as a priority for the twelfth and latest 5-year plan announced in March 2011. (ICTS 2011)

Based on the authors observations the pollution issue is extreme and its effects are not limited to adverse health effects. The pollution problem observed in Anyang is on the level where it causes disruption in day-to-day operations of people and enterprises as the pollution reaches levels where public transportation is halted due to poor visibility caused by extreme pollution. The locals informed that as the pollution problem is especially extreme in the city of Anyang, the Henan provincial government took action by replacing some of the top officials, who instantly took action by shutting down several factories. As noted by the author, the actions typically taken in China against the pollution issue lie in shutting down factories and as in the case of Beijing giving temporary driving restrictions, such as limiting driving rights in the city to cars that have an odd, or even license plate for certain days. The policy was first introduced in the Beijing Olympics of 2008 and is currently being considered for permanent use due to good results. The quite direct restriction policies established to reduce pollution are a visible sign of the lack in cleantech solutions and companies in China, which is also noticed in the Chinas considerable investments in cleantech outside its borders.

#### 6.1 SWOT analysis of Finnish cleantech entering China

In this part we will explore the strengths, weaknesses, opportunities and threats for Finnish cleantech businesses attempting to enter the Chinese market.

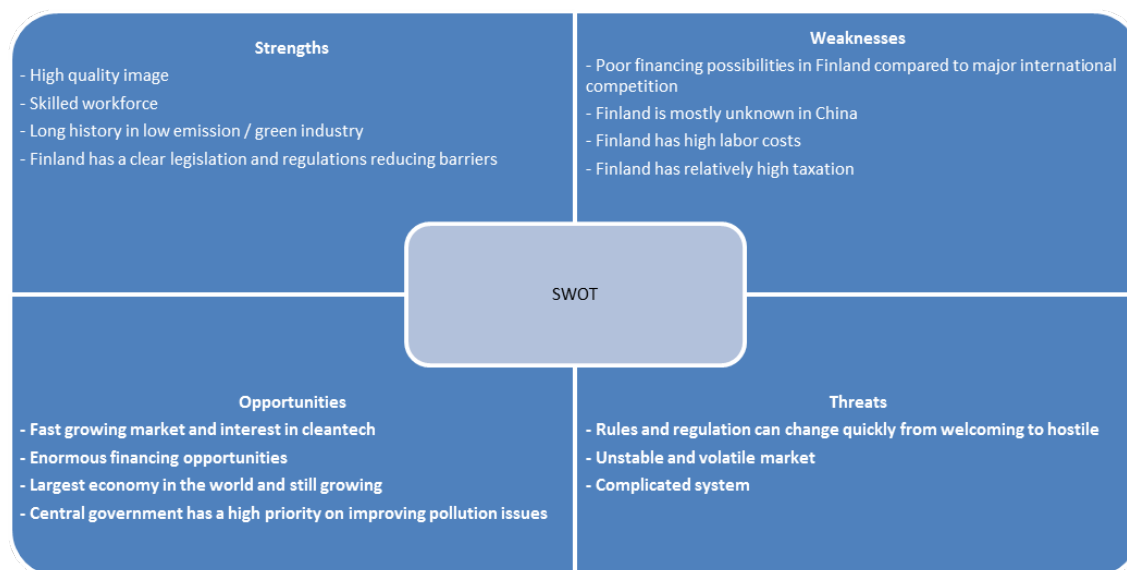


Figure 8: SWOT analysis of Finnish cleantech entering China

Finland has many strengths that support its cleantech industry against international competition such as the long history in sustainable production. As an example of the Finnish history in maximizing energy efficiency can be noted the extensive use of combined heat and power plants or cogeneration plants that create both heat and electricity which have been in extensive use already before sustainability was an issue that nations paid attention to achieving a total efficiency typically over 85 %, compared to the common standard in which these power plants are often separate running at an average of only 45 % efficiency rate in many other nations. (EnergyEnviroWorld 2008) (Kerr n.d.,1)

The weaknesses for Finnish companies lie in the Finnish welfare society leading to high taxation, and costs, which is expected to cause Finnish companies and products to have potential threat from price pressure.

Other weaknesses include the reputation of Finland, which despite the claims of many politicians and parties in Finland is not good, or bad, it does not exist. While Finland holds good brand and reputation in the views of those who know Finland, the issue is that very few know Finland. The author experienced when in contact with the locals, the most common response for Chinese locals to hearing the author's country of origin, Finland, was either confusion, or pondering over what and where Finland is, the lack of knowledge about Finland was dominant with the young and old Chinese, and by both low and high educated. The lack of knowledge about Finland can prove to be a weakness for Finnish companies, as the author has observed the Chinese people often give significant importance to the country of origin of a product and or a company.

The importance of origin was clear when observing the purchase decisions of locals who as an example despite often hold personal grudge towards Japanese for World War 2 trust Japanese

products and their quality, while the general view of Chinese products is: low quality, low reliability and unsafe. Major well-known countries such USA, Germany, Japan, France, Australia and United Kingdom each are highly respected and trusted in China and companies originating from them might have a country image advantage over Finnish competitors. Finnish companies however can expect a significant advantage for quality image against potential Chinese competitors.

The opportunities in the Chinese market are substantial. The Chinese economy is the largest in the world as of 2014 and the size of the economy is growing, the pollution problem in China has been growing together with the economical growth in the country and the government has increased the pollution issue as one of the highest priority issues. The solutions, mostly limited to restriction policies thus far, are not sustainable and the growth in the demand of much needed cleantech where Finland excels is high and still growing. China presents vast financing opportunities, which works to counter the weakness of Finland's weak financing opportunities.

The threat presented in the Chinese market are laid in complicated juridical system, making it often problematic for operating in the market and the political system, which is praised as well as criticized for its strong and fast executed policies. The Chinese political system which while presenting a timely response to found problems in the society, can shut down even major foreign (and local) operations near-instantly, if it falls out of popularity of the governing administration. As an example of the political changes that can force the shutdown of operations, the author uses the NGO draft mentioned in the chapter 3.2 Chinese economy.

## 6.2 Risks

Entering a new market always has risks and potential problems; this part studies the risks and issues of exporting to China.

China is an authoritarian communist country with an (limited) open market, creating a very special business environment with its unique challenges.

Some of the risks that exist when doing business in China are due to the weak level of legislation in the country and lack of governance, which leads to for example issues with warranty as well as Chinas notorious reputation regarding copyrights infringement. Other issues are the complexity of decision marking in the country and the amount of bureaucracy and the multi-step process of the system is very different than what companies used to working in the Finnish business environment. Foreign companies and institutions have raised alarm on one of the major problems regarding to working in China being with the acquiring and holding of skilled middle and upper management. (FinPro 2010, 7)

Other things to consider when dealing in China and with Chinese businesses, is to understand that the corruption issue is a very real threat for companies. The differences in salaries and quality of infrastructure among others between different provinces in China are substantial. (FinPro 2010, 7)

Intellectual property rights have been a major issue for all foreign companies, as well as local Chinese companies and the direct copying of products and entire company brands are not uncommon and are extremely visible and observable in all day-to-day operations in the country, with very little possible actions especially for foreign businesses to take. There have been many high publicity cases, in which the intellectual property rights were under western media coverage and public opinion clearly violated, but ended with Chinese courts deciding in the favor of the accused intellectual property violator. These issues are easier to avoid in industrial business to business relations, than in consumer products, however it still requires companies to manage the risk through methods such as careful partner and employee consideration. The risk of intellectual property infringement holds high risk, which can be influenced greatly by pre-emptive measures such as before mentioned careful partner and employee selection, and information security management. The impacts of these problems for technology companies can be high, as a competitor copying existing technology can thus effectively steal a competitive advantage, or cause significant PR-harm by intellectual property violator selling poor quality counterfeit products as authentic.

#### 6.2.1 Corruption

Corruption is an essential part of doing business in the Chinese market and can be a significant barrier for Finnish entrepreneurs inexperienced in working high-corruption nations. Corruption in the standard of Finnish society compared to the Chinese one is very different, behavior and actions interpreted as corruption in Finnish society are in many cases the norm in Chinese culture and the standard of behavior and the public opinion is often positive instead of negative.

Some examples based on the authors observations in China about how common and extensive the corruption, or what Finnish people in general would deem as corruption, in the Chinese society is how parents are expected to buy gifts for their children's teachers. Gifts for the teachers are expected in order for the child to get acceptable grades and attention in class and the lack of gifts, or if the teacher deems them too low of value can lead to a child being neglected by the teacher as a punishment according to informal discussions with Chinese locals. This culture of gifting is the norm of the society and is not frowned upon, but gifts are recognized as a bonus in certain jobs and positions. The gifting practice is not limited to schools and is present in all parts of the Chinese society, companies often give these gifts

during tendering processes to decisions makers, in order to buy their way into having their company winning the tendering process.

According to several informal interviews with Chinese locals with ties to entrepreneurs, there are major issues with corrupt government officials claiming something of a protection money, or 'consulting fee' and refusing this payment may lead to considerable problems with licenses and permits for operations, or lead to unspecified investigations and other business harming operations. However these kind of serious problems from corrupt government officials are believed to be unlikely for foreign operators to experience, especially if working in partnership with government owned companies. It is to be noted that while these issues caused by corrupt government officials are unlikely for foreign operators, the damage they can cause varies from slight to critical and at worst holds potential to endanger entire operations in the Chinese market.

The corruption issue has been recently under greater priority by the current Chinese president Xi Jinping with his anti-corruption campaign, which he began as he stepped into power in 2013. The effects of this were clearly visible to observe for the author in Anyang during 2014-2015 as previously successful high-end restaurants and establishments seemed abandoned compared to previous visit in 2011, which after discussions with locals revealed to be much due to the efforts of Xi Jinpings administration. The locals widely acknowledged the anti-corruption war showing in the lack of customers in the mentioned high-end restaurants and establishments. It was explained by locals that majority of their customers used to be public sector officials paying for the personal dining and amusements with government money and with the anti-corruption war started by President Xi Jinping the public officials are too scared of anti-corruption investigations and have stopped those activities.

### 6.3 Benefits

Doing business in China and with Chinese companies hold large opportunities for several reasons, including the massive population and the relatively fast development in the nation that has created a situation in which there's constant growth in demand of almost all kinds of products as reported by FinPro. Some of the potential fields of industry and areas of business that have considerable opportunities in the Chinese market according to FinPro are industrial machines as the production of different items and development of factories is ongoing, information technology as the country is rapidly expanding its mobile and internet services in the country, shipyard industry machinery for the expanding shipping businesses, automation systems and equipment, medical and agricultural production systems and equipment. (FinPro 2010, 7)

China is also notorious for its pollution issues which are raising awareness in the eyes of the general Chinese population and the Chinese government has included environmental issues in its most recent 5 year plans on which the development of the nation is based. This creates significant opportunity for the growing Finnish cleantech industry that has gathered already some international reputation. FinPro reported in 2013 how the Beautiful Beijing project targeted at solving the Beijing pollution issues brings multibillion euro opportunities to Finnish cleantech companies. (FinPro 2013)

#### 6.4 Market analysis

This section aims to create an analysis of the size of the Chinese market and growth potential for Finnish cleantech. The challenges lie in the previously mentioned pace of development in the Chinese market and the availability and constant fluctuation of any statistical information.

To establish an estimate is challenging with a market as unique and volatile as China, but an estimate is still necessary to create a relative understanding of the Chinese market potential. To create an estimate of the market potential we will use the Beautiful Beijing project mentioned earlier in the study which is a co-operation project between Finland and China aiming to boost Finnish cleantech into China, with Beijing as the focus city.

Export Finland explains the aim of the Beautiful Beijing project as follows:

”Program Targets:

- 300 new jobs for the cleantech sector in Finland
- Support the 3 billion euro export target of the cleantech sector by connecting Finnish cleantech companies to Chinese value networks and increasing the export of cleantech companies
- 10 percent growth of Finnish SMEs’ annual turnover”

(ExportFinland 2015)

To create an estimate of the market size the author will make a calculation based on the project targets, with the expectation of pollution levels correlating with them. According to Greenpeace (2013) a study on 74 Chinese major cities pollution levels, measured by the fine particles level (PM 2.5) is 1,28 times the average of the 74 Chinese cities ranked by their fine particle levels. Through this method the author creates an estimate of the effect for Finnish cleantech, should the Beautiful Beijing project be expanded to the whole urban population of China, which according to 2015 estimates is 55,6 % of the population of 1,37 billion, which would mean 761,7 million. (CIA 2015) (NY Department of Health 2011) (Appendix 1)

	Population	Population multiplier	Pollution multiplier	Jobs	Exports (Mil. €)
Beijing	20 384 000	1	1,00	300	3000
China urban	761 720 000	37,37	0,78	8758	87582,48

Figure 9: Market estimate.

The market estimate built by the author would suggest, that the Chinese market holds potential for increasing the Cleantech exports to 87,6 billion euros. An important factor to notice is, that the GDP of Finland was 196,5 billion in 2012, meaning that the calculation method would suggest that the market potential is 45 % of the Finnish GDP in 2012. The significance for the entire GDP would be so substantial, that the only situation in which the Chinese cleantech market would not hold nationally significant potential for Finland, would be that the demand for cleantech in Beijing would be unique and the Beijing situation would not correlate with the rest of urbanised China, which the author deems highly unlikely based on the observed and studied pollution situation in China. (UHY international 2013)

Based on secondary data analysis, the author deems the Chinese competitors to currently lack knowledge and expertise in cleantech to efficiently compete with Finnish cleantech businesses. The author adds, that it is crucial to consider, that Chinese businesses have been historically excelled in copying and catching up to competitors and the lack in knowledge and expertise is thus to be used in advantage early as it is still possible.

### 6.5 Documentary analysis

This section presents the analysis by the author of the situation in the cleantech sector and its forecasted future, especially focused in the industrys expansion to the Chinese market.

By analyzing the news articles; the pace and publicity of cleantech related news have experienced significant increase post 2010 and the author found, that China plays a significant part in the news and developments of the industry, especially in the post 2010 articles, due to the importance of the Chinese investments in the industry.

According to the authors analysis on the direction the cleantech sector is developing, based on articles by private media and cleantech related organizations; the future growth of the cleantech industry was especially directed in the developing markets, in which China held an increasingly important part, but other developing nations including Brazil, India and African nations are expected to be the next stage of market expansion in the industry. The estimates from different sources were pointing to the same direction, cleantech is an industry, which while being an industry that relies on the latest technological developments, the most prom-

ising market potential for growth in the cleantech sector is expected in the developing nations.

Through documentary analysis, the author noticed the general expectation is for environmental issues to experience more growth, while the news and journals in the field give a positive message for the growth and development of the cleantech industry, the belief seems to be for environmental issues to grow faster, than solutions brought by the advances in cleantech.

The author would like to present an opposing view to the generally positive and encouraging messages to the cleantech industry, from an article by Lihui Zhang from 2013, in which he claims that in the previous 2 years (2011-2012) the investments in the Chinese cleantech had in fact reduced and several major Chinese cleantech operators had bankrupted. Zhang continued to present his expectations on this to be mainly the result of the financial crisis and could be temporary, which the author concurs with based on the continued increase in cleantech investment. The author claims this could also be a sign of the Chinese investors preference of investing in the more technologically developed foreign competitors to these Chinese cleantech firms, as there's been significant mentions of Chinese investors changing their traditional preference of companies focused on tangible assets (Chinese companies are typically asset focused), to companies that are more R&D, or innovation focused, which tend to lack tangible assets. (Zhang 2013)

## 7 Conclusions

This chapter presents the authors conclusions based on the research and information presented previously in the study. The author will continue by presenting suggestions for possible further studies in the subject.

The Finnish economy has been in a recession and the balance of trade has been negative for Finland, reaching an all-time low in 2012. As studied by the author Finnish economy has been experiencing several years of downturn in exports and GDP, which require rectifying through new industry exploration.

China has experienced constant growth since the 1978 market reformation that started taking effect from 1979, however Finland can be said to have failed to use the opportunity this has presented and as a result has held a significant trade deficit with China, with relatively low growth in exports compared to the development of the Chinese market.

As found by the author in the early stages of the research, cleantech business is a relatively new industry and information was limitedly available. However it was proven clear that the cleantech industry is experiencing a rapid growth and due to large parts by the extensive investment opportunities presented by Chinese investors and government support. While the Chinese cleantech market is experiencing rapid development, it is criticized for its dependency of European businesses skills and expertise, which is a clear advantage for Finnish companies. Chinese competitors lack many of the skills and knowledge required to efficiently compete, which creates significant opportunity for Finnish companies to expand their control in the market, however these can be read as a significant threat for Finnish companies if they fail to utilize the Chinese market potential while the local competition is lacking.

The author observed and interviewed locals in Anyang, Henan China which is rated as one of the cities in China experiencing from the severe effects of pollution. The author observed the effects of the high levels of pollution as public transportation was experiencing downtime for cancellations due to poor visibility, that was caused by pollution fog. The locals were generally very worried of the health effects of the population and face masks were widely used in the population in an attempt to reduce adverse health effects due to pollution. Local government had taken limitation actions by temporarily and permanently shutting down factories. Limitations were generally accepted as methods of temporary improvement, while sustainable solutions were unavailable.

As the author analyzed the potential of the market on the basis of the Beautiful Beijing project, and the actions taken by the Chinese government that has been basically inviting foreign cleantech operators to take a part in solving the environmental crisis that China is experiencing, the potential for Finnish cleantech companies growth in the Chinese market is nationally significant and the author claims it has the potential for becoming a new cornerstone for the economy.

As potential topics for further study, the author deems the need of Chinese perspective, to create a more comprehensive picture of the Chinese cleantech sector. Case studies built on cleantech operators and their experiences in entering the Chinese market, as well as case studies built on the experiences of the Chinese clients and investors, to better analyze potential miscommunication and expectation mismatches.

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