

Greenup, Katherine; Löchel, Horst

**Working Paper**

## The relative attractiveness of Germany and the United States for Chinese overseas investments

Frankfurt School - Working Paper Series, No. 221

**Provided in Cooperation with:**

Frankfurt School of Finance and Management

*Suggested Citation:* Greenup, Katherine; Löchel, Horst (2016) : The relative attractiveness of Germany and the United States for Chinese overseas investments, Frankfurt School - Working Paper Series, No. 221, Frankfurt School of Finance & Management, Frankfurt a. M.

This Version is available at:

<https://hdl.handle.net/10419/142769>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

**Frankfurt School – Working Paper Series**

**No. 221**

**The Relative Attractiveness of  
Germany and the United States for  
Chinese Overseas Investments**

by Katherine Greenup and Horst Löchel

June 2016



**Frankfurt School**  
of Finance & Management

**German Excellence. Global Relevance.**

Sonnemannstr. 9–11 60314 Frankfurt am Main, Germany

Phone: +49 (0) 69 154 0080 Fax: +49 (0) 69 154 008 728

Internet: [www.frankfurt-school.de](http://www.frankfurt-school.de)

## Abstract

Over the last decade, Chinese outward direct investment (ODI) has been rapidly growing in technologically advanced countries. In this paper, the investment trends are explored with a particular focus on the United States of America and Germany. While the Chinese investors are interested in the U.S. as a powerhouse of technology creation, they may also find Germany an attractive option with its concentrated technological offerings and an easier access. Using 13 factors explores not only technological attractiveness, but also cultural affinity and any trade frictions and investment openness. This paper looks to see if Germany or the USA is overall a more successful location for Chinese ODI.

Key words: Overseas Direct Investment, ODI, Germany, Outwards FDI, China, United States of America

JEL classification: F21, F23, F52

ISSN: 14369753

Contact:

**Prof. Dr. Horst Löchel**

Frankfurt School of Finance & Management  
Sonnemannstraße 9-11  
60314 Frankfurt am Main  
Germany  
h.loechel@fs.de

**Katherine Greenup**

Frauenlobstrasse 42  
55118 Mainz am Rhein  
Germany  
katherine.greenup@gmail.com

## Content

1.	Introduction	6
2.	Literature Review	7
2.1.	Types of Chinese ODI	8
2.2.	Comparison of Chinese ODI to Other Country's	9
2.3.	China's Current Relationship with the USA and Germany	10
3.	Analysis	11
3.1	Hypothesis 1 Overview and Methods	11
3.2.	Hypothesis 1 Results	11
3.3.	Hypothesis 2 Overview and Methods	12
3.3.1.	Impact of Equalizers and Weights	12
3.3.2.	Time Frame	13
3.3.3.	Technological Attractiveness Index	13
3.3.3.1.	Brand Names	13
3.3.3.2.	Technology	13
3.3.3.3.	Distribution Networks	14
3.3.3.4.	Research and Development	14
3.3.3.5.	Managerial Competencies	14
3.3.4.	Entry Attractiveness Index (EAI)	15
3.3.4.1.	Openness to Chinese Culture	15
3.3.4.2.	International Trade and Investment Environment	16
3.4.	Hypothesis 2 Results	17
3.4.1.	Control Scenario	17

3.4.1.1. Technological Attractiveness Index	18
3.4.1.2. Entry Attractiveness Index	18
3.4.1.3. Total Chinese ODI Attractiveness Score	18
3.4.2. Scenario Tech	18
3.4.3. Scenario Openness	19
3.4.4. Scenario Investment	19
3.4.5. Scenario Entry	19
3.4.6. Review of the Scenarios	19
3.5. Hypothesis 2 Interpretation	20
4. Conclusion	21
4.1. Review	21
4.2. Research Findings	21
4.3. Recommendation Highlights	22
4.4. Limitations of Research	22
4.4.1. Conflicting and Unavailable Data Set	22
4.4.2. Miscellaneous	22
4.5. Future Outlook	23
Sources	24
Appendix A: Sources of Index Factors	28
Appendix B: S Control	29
Appendix C: S Tech Brand Names	30
Appendix C: S Tech Technology	31
Appendix D: S Tech Distribution Networks	32
Appendix E: S Tech R&D	33

Appendix F: S Tech Managerial Competencies	34
Appendix G: S Openness	35
Appendix H: S ITIE	36
Appendix I: S Entry	37

# 1. Introduction

The amount of outwards direct investments, in short known as ODI, has been noticeably growing from China, reaching a record level of US\$84bn in 2012 (Zhan et al., 2013:overview xvii). For the first time ever, China is the third largest foreign direct investor in the world after the United States and Japan (Zhan et al., 2013:6). Potential host countries have taken notice to these trends. In 2013, sixty percent of investment promotion agencies, or IPAs, ranked China as the most promising source of foreign direct investment (Zhan et al., 2013:21). New figures provided by Baker & MacKenzie (2016) show that in 2016 Chinese investors poured a record of US\$ 40bn to the United States and Europe.

In light of these trends, the study of Chinese ODI is categorized as a “relatively new but rapidly growing field” (Huang et al., 2013:90). In the past, economists have seen other developing countries engage in ODI; however, it has never been on the same immense scale as China (Huang et al.2013:103). China is actually rather unlike other countries in the way of how it manages its foreign direct investment, or FDI. The three particular aspects, in which it differs, include: (1) the influence of its government, (2) the fact that it is driven by pull factors, such as the desire to secure natural resources or to acquire technology, and (3) that cost minimization is not a prioritized factor, as it already has enough low cost labor and land (Deng 2003:120). Furthermore, it is important to note that China has massive capital reserves, which could be utilized for ODI, which can increase the ODI made to seek new technologies (Huang et al.2013:103).

The ability to acquire new technology and use it effectively is a crucial factor for becoming a successful economy (Dunning et al., 340, 2008). Therefore, countries like China have found that engaging in ODI can be a significant way of obtaining advanced technology from technology rich countries (Wong et al., 2003:285). Therefore, the United States of America and Germany were interesting subjects in this research, as they are known for being homes to advanced technology. Remarkably, even though there is an increasing amount of ODI coming from China to the USA and Germany (Bilateral FDI Statistics), there are conflicting and not strongly proved propositions why this may happen and what factors are driving it (Huang et al., 2013:89-90). This research aims to shed light into this discussion by testing the question whether Germany or the USA is a more successful technology-seeking ODI location for China?<sup>1</sup>

With this question, the objectives of the paper can be created. The first objective is to conclude Germany and the USA are both strong technology hosts. This should be done to ensure that they can be compared reasonably and fairly. The next objective is to determine which country is a better-suited host for China’s technology-seeking ODI. The objectives here will be hypotheses of the paper:

**Hypothesis 1:** The United States of America and Germany are strong technological hosts

**Hypothesis 2:** Germany is a more attractive ODI location than the United States

---

<sup>1</sup> A short version of this research was already published as policy paper (Greenup, Löchel 2015).

First for hypothesis 1, it is necessary to determine if both the United States of America and Germany are desired for their technological resources. To prove this, the Revealed Competitive Advantage, or RCA, index will be applied to both countries. After the hypothesis is proven true, the testing will end for this hypothesis. If one country were to fail any of these tests, the research would not continue.

Once hypothesis 1 is proven true, the analysis for Hypothesis 2 will be conducted. The tests conducted for hypothesis 2 will be significantly more complicated as they involve more factors, which are compiled in the form of indices and various scenarios. The goal of the tests is to see how well the countries perform, not only in technological attractiveness, but also in their openness to Chinese culture and trade. As the political and economic forces of the world are ever changing, different scenarios will be run to demonstrate changing economic factors, policies, and preferences of technology-seeking investors. The most recently available numbers were used in the creation of the index.

As expected, Germany and the USA are both strong contenders to be hosts of technology-seeking Chinese ODI, proving hypothesis 1 true. From the scenarios run under hypothesis 2, the U.S. was most frequently found to be the stronger host for Chinese ODI, thus proving hypothesis 2 wrong. As often is the result from tight competition, the implications of this research are even more meaningful for the two countries.

The exciting part of this research is that there are many applications to business, policy and the research field. Both businesses interested in receiving Chinese investment and supporting firms can profit from knowing why Chinese investors are investing. Policies can shape education and cultural services to prepare citizens for Chinese investments and culture.

After the conclusion is discussed with the findings, the main limitations the research faced and future directions of research will be explored. The limitations have mostly to do with the fact that the field of Chinese ODI, technology-seeking in particular, is relatively under-researched. Recommendations will also be provided for policy makers, researchers and businessmen.

## **2. Literature Review**

Current Chinese outwards direct investment, or ODI, is not only unique for its momentum and growth. The story behind today's Chinese ODI is also unlike that of any other countries'. The majority of the following history discussion will cover the post-1978 era, which began with the introduction of the "Open Door" policy reforms. However, it is important to note that some Chinese ODI took place before that time. Before 1978, the government would decide the markets, industries and sectors for international expansion (Wong et al., 2003:279). The investments could be characterized as highly government-involved, implying "small scale investments by Chinese SOEs [or State Owned Enterprises]" (Wong et al., 2003:279). The government was involved in the investment not only because they owned the firm, but also they would like to ensure that the ODI "would meet the country's long-term development strategies" (Wong et al., 2003:279).



In 1978, The Chinese “Open Door” policy was initiated and, according to some researchers, it is referred to as the “key-defining event in contemporary Chinese economic history (Cheung et al., 2009:314). The policy outlined two major objectives for the country’s stance regarding FDI and ODI. One aim was to increase the level of attractiveness of foreign firm investments in China, while the other intention focused on investing in other countries (Cheung et al., 2009:314). Until 1985, only state-owned firms were allowed to invest overseas (Wong et al., 2003:279). After 1985, the permission to partake in ODI was expanded to private firms (Cheung 2009:314). As proven in Buckley et al.’s paper, there was a positive relationship found between the liberalization of Chinese FDI policy and the beginning of increasing Chinese ODI (2007:509). However, since Chinese managers were inexperienced at ODI, investments often incurred substantial losses and the upsurge of activities quickly suffered from the increasing restrictions on ODI from the government (Cheung et al., 2009:314).

From the end of the 1990s to the early 2000s, regulation from the Chinese government began to be considerably eased (Buckley et al., 2008:724). The reasoning for this, according to Buckley et al., is attributed to the “Going Global” policy, which was formalized in both China’s 10<sup>th</sup> and 11<sup>th</sup> Five Year Plan (Buckley et al., 2008:724). In December 2001, China became a member of the WTO (*Member Information*). In 2003, the official ban of private enterprises investing abroad was lifted (Buckley et al., 2008:724). Government agencies transformed their role from a majorly regulatory body into one that provided advice and guidance to outbound investors.

Currently, China is one of the main drivers of ODI from Asia (Zhan et al., 2013:6). China jumped from the sixth to the third place in the ranking of the world’s largest investors (Zhan et al., 2013:xiii). In 2012, ODI from China reached a record high of US\$84bn (Zhan et al., 2013:xvii). Today, Chinese companies are on the road to internationalization, driven by objectives that have taken them into varying industries and countries (Zhan et al., 46:2013). China continues to be driven by pull factors, such as the desire to secure natural resources or to acquire technology, in order to secure the future of the country (Deng 2003:120). These factors could likely have a significant impact on Chinese ODI’s appearance in the future as well.

## **2.1. Types of Chinese ODI**

According to Huang et al.’s findings in 2007, Chinese firms took part in resource-, market-, technology-, and efficiency-seeking ODI, listed in descending priority (93). However, when manufacturing sector was examined individually, technology was the top reason for outwardly investing. To simplify and to combine findings from other researches, the ODI types will be referred to as market-seeking, resource-seeking, technology-seeking, and efficiency-seeking, as were named in the Huang et al. paper (2013:90).

For the market-seeking type of ODI, investments in an overseas country are sought in order to “supply goods or services to markets in ... [the country in which it invested] or in adjacent countries” (Dunning et al., 2008:69). However, since China is more concerned with the “pull forces” and securing solutions to its home strategies, other markets are often not explored unless they provide such a solution (Deng, 2003:120).

The motivation behind resource-seeking investments is to invest abroad for “particular and specific” resources that are either of a higher quality or of a lower cost of obtaining than found at home (Dunning et al., 68, 2008). It is hypothesized that China invests abroad in these situations to collect resources, such as oil and minerals (Fung et al., 2009:90). Deng feels that China is more likely to seek security via the resources and it comes with little surprise that most, if not all, of the resources collected are shipped back to the mainland (2003:115), which is in line with Dunning et al.’s thoughts (2008:68).

The efficiency-seeking type is characterized by firms dispersing design and production facilities globally to generate economies of scale and scope, and to secure access to cheaper inputs, especially labor. Outwards direct investing firms take advantage of the difference in factor endowments to improve production efficiency. Efficiency-seeking ODI is normally sensitive to cost factors (2013: 93). As China currently has enough low cost labor and land, Chinese investors do not need to leave their borders to source it (Deng 2003:120) and therefore, efficiency-seeking ODI has the lowest priority (Huang et al., 2013:94).

Increasingly, the progress of country’s economic growth can be explained by the level of technological know-how (Fagerberg et al., 2002:1303). In a broad sense, it is done to capitalize on what makes another firm “unique” – this can be a particular activity, capability, or operating environment (Dunning et al., 2008:73). Doing this, investors can hope to augment and strengthen its existing portfolio or provide it with an advantage over its competitor (Dunning et al., 2008:72-3). In the case of China, technology-seeking ODI has been an effective way of acquiring new knowledge to grow the economy, an essential factor in upgrading, and it is normally accomplished through joint ventures (Wong et al., 2003:285).

## **2.2. Comparison of Chinese ODI to Other Country’s**

The path that China is taking with its ODI is unlike other countries, even from other countries that are classified in the same level of development. Below, ODI country types will be described to further highlight the differences between China and other forms of outward FDI, specifically, those from the U.S., Japan, and other developing Asian countries.

ODI from the U.S. is characterized as a market-seeking ODI (Huang et al., 2013:99). Therefore, the U.S. invests in this manner to avoid the costs of exporting, such as tariffs and other import controls placed by the host governments (Dunning et al., 2008:71). Currently, Chinese ODI is not meant to serve host markets abroad, but rather to strengthen the domestic economic situation.

Japanese ODI is categorized as efficiency-seeking (Huang et al., 2013:99). Interestingly, Japan today is currently engaging in more American-style ODI (Huang et al., 2013:99); however, this example will be used for demonstrative purpose to compare economic stages. As of now, China does not need to take advantages of cheap labor or land in foreign countries as what Japan did. Due to the “imbalance of economic development among the provinces,” it can find benefits within its own borders (Huang et al., 2013:100). However, this is not a sustainable solution as changing levels of prosperity within the inner provinces could change the future face of Chinese ODI.

While developing Asian countries do not have much in terms of ODI funds, they do have advantages, such as lower levels of costs for production and technology (Huang et al., 2013:104). According to Buckley et al., there are five main attributes to characterize developing Asian country ODI (2008:718). First, they have the advantage of understanding how to operate and manage within similar markets (Buckley et al., 2008:718). Next, they tend to invest in nearby, developing countries due to the reduction of geographic differences (Buckley et al., 2008:719). The third characteristic is the movement to “psychically-,” or culturally or historically, close countries (Buckley et al., 2008:719). Fourth, their entry mode decision is based on their capital availability and risk appetite (Buckley et al., 2008:720). In this literature review, it is not considered a main identifier of developing country ODI, as it varies so much across countries, which is apparent in Buckley’s study (Buckley et al., 2008:720). The final distinguishing factor of developing Asian countries ODI is the assistance they receive from their respective governments, found in the “privileged access to raw materials, cheap capital, and government support” (Buckley et al., 2008:720). In comparison, while Chinese firms do enjoy financial resources and government support like the other developing Asian countries (Huang et al., 2013:85), they do not always invest in markets that are geographically or culturally close to home. For example, China has entered into regions, including Africa and Latin America, with more than 5% of FDI stock or more (Dunning et al., 2008:52).

### **2.3. China’s Current Relationship with the USA and Germany**

It is important to note that China has massive capital reserves, which it has been accumulating over the last ten years that of which could be utilized for ODI (Huang et al.2013:103). This is could be a major factor for the increase in technology-seeking Chinese ODI (Huang et al. 2013:103). Therefore, countries like China have found that engaging in ODI is a significant way of obtaining advanced technology from technology rich countries (Wong et al., 2003:285). The USA and Germany are interesting subjects in this research not only because they have a reputation for being homes to advanced technology, but also because there is an increasing amount of ODI coming from China to the USA and Germany (*Bilateral FDI Statistics*). As of 2014, China invested over \$1.4B into Germany and over \$2.5 into the USA (*Bilateral FDI Statistics*). An overview of their present-day relationship will be examined.

As pointed out by a recent study by Baker & McKenzie (2016), there are several similarities as well as differences between Chinese investments in the USA and in Europe. In both regions, Chinese companies look for access to advanced technology and manufacturing. Furthermore, rising investment in real estate as well as financial investments in the face of capital account liberalization is more common in both regions now than in the years before. The most striking difference is the fact that Chinese state-owned enterprises invest significantly more in Europe than in the USA, which in turn is positive correlated with the larger scale of the respective investments.

Despite of recent trends, national security is a particular concern in the USA for their policies regarding FDI, especially from China. The current Chinese ODI situation is reminiscent of the Japanese ODI of the 1980s in the U.S. (Dunning et al., 2008:645). The “hollowing out” concerns of the 1980s could be experienced again, as most Chinese technology-seeking ODI is accomplished through joint ventures (Wong et al., 2003:285). While the amount of the investments from China has not yet reached Japan’s past levels, China is sometimes seen as

“flouting the ‘rules of the game’” with their “protracted current account imbalances and an undervalued currency of the investor’s home country” (Dunning et al., 2008:645).

As Germany does not have as much FDI from China as the U.S., investment issues with China are not substantial. Germany’s main relationship goals with China revolve around “dynamic trade relations, investment, environmental cooperation, cooperation in the cultural and scientific sector as well as frequent high-level visit in both directions” (*Bilateral Relations*).

### 3. Analysis

In the analysis section, the findings from the literature review will be explored further. The U.S. and Germany will be compared in order to determine their technological capacity and strength. The findings will be later compared to existing evidence and current situations.

#### 3.1. Hypothesis 1 Overview and Methods

*Hypothesis 1: The USA and Germany are strong technological hosts.*

According to Makino et al., firms that want to grow their technological advantages will seek investments in countries where those advantages exist (2003:406). In this research, it is therefore important to use indicators that reveal which country is more technologically advanced. Huang et al. used a combination of the Revealed Comparative Advantage (RCA) and GDP per capita as indicators for high technological strength (2013:92-3). The RCA was developed by Bela Balassa and is “the ratio of a country’s exports in a particular commodity category to its share in total merchandise exports,” which is then compared to the world’s ratio (Balassa et al., 1989:9). In this case, a high level of technology exports will be used to conduct the comparison. Any results higher than 1 (one) indicate an advantage (Huang et al., 2013:92).

Another indicator for technological strength is GDP per capita, because “rich countries with high GDP per capita are also possessed with more technologies” (Huang et al., 2013:93). As an additional step, both countries were tested to see if they have a higher GDP per capita, or GDPP, than the OECD GDPP.

#### 3.2. Hypothesis 1 Results

This hypothesis was proven true. Both Germany and the USA scored higher than 1 on the RCA index. In the second test regarding GDP per capita, or GDPP, both countries also had amounts higher than the OECD GDPP. In conclusion, after passing both tests, both countries are able to be considered appropriate hosts for technology-seeking ODI from China.

### 3.3. Hypothesis 2 Overview and Methods

*Hypothesis 2: Germany is a more attractive ODI location than the United States.*

After a country's overall technological strength has been proven, the factors that form a country's attractiveness need to be examined. Being the more complex of the two hypotheses, the next step of the analysis is to create an index using a comprehensive list of factors that will check not only the technological attractiveness, but also how "open and welcome" each country is to Chinese FDI, or its entry attractiveness. Therefore, the two main sub-indexes will include the Technological Attractiveness Index (TAI) and the Entry Attractiveness Index (EAI). It is assumed that the technological attractiveness of a country is the reason why China will initially decide to invest in a host. Therefore, the TAI is given the 2/3 of the total index weight for the scenarios, unless stated. The EAI will make up the remaining 1/3 of the weight, unless stated.

There are multiple factors under each of the main groups. Factors were derived from other indexes, literature, and educated assumptions. All numbers, as they are diverse in nature, will be calculated with the highest weighted number being the most desirable for China<sup>2</sup>, unless stated.

#### 3.3.1. Impact of Equalizers and Weights

When comparing factors, it is important to understand how the significance of a country's market size has upon its attractiveness to China. Buckley found that overall, the absolute host market size and host market growth are not significant factors in attracting Chinese ODI (Buckley, 2007:509). However, Chinese ODI is associated positively with host market size per capita (Buckley, 2007:509). Consequently, the *density* of a factor is more important than its *absolute* size or growth. To compare countries by density, equalizers were introduced. They are designed to bring a variety of factors to a manageable and comparable level. When needed, an equalizer will be tailored to the factor and its size in order to fit the index.

While one of the roles of the equalizer is to account for differences in factor density among countries, equalizers are also used to ensure that factors do not inappropriately depict the degree of importance, either high or low. In order to be consistent and not inappropriately render the degree of importance to a factor, neither country should have greater than .09 or nine hundredth for a score of a factor. Only one country is allowed to have a value lower than .001 or one thousandth.<sup>3</sup>

Weights have a different role from equalizers in the calculations. The impact of weights is to adjust the importance of a factor in the final calculation. It is a way of quantifying how important a factor is to attract ODI from China. These weights will be manipulated throughout the experiment in different scenarios to see the effect of a factor's importance upon the whole score.

---

<sup>2</sup> Please refer to Appendix A for a full list of factors and their sources

<sup>3</sup> A description of equalizers can be found within Appendixes B-I.

### 3.3.2. Time Frame

The data used are the most recently available numbers for both countries, using the same source and time frame per factor. Database amounts are accurate for the date in which they were pulled. This is an important limitation, as not all data were pulled for the same year.

### 3.3.3. Technological Attractiveness Index

In the 2013 Asian Development Review, researchers Huang et al. recommend from their findings that “Chinese enterprises therefore would not waste any chance to acquire strategic assets such as brand names, technology, distribution networks, R&D facilities, and managerial competencies to elevate their core competitiveness in an increasingly tough world market and more liberalized domestic economy” (Huang et al., 2013:102). Using these factors, the Technological Attractiveness Index was built. Since there is little evidence to support which factor is more important than the others, each subsection is to be given the same weight, unless stated. The following will include a description of each of the factors and how they will be quantified.

#### 3.3.3.1. Brand Names

Chinese firms’ outwards direct investments are occasionally made to acquire prestige or familiarity that has already been accomplished by an established brand name. By checking the list of the Global 500 2015, which lists “The World’s Most Valuable Brands” compiled by Brand Finance (*Global 500*), one can determine which country has a highest number of valuable brands. The number of brands from each of the countries will be tallied. To account for country size differences and to bring the final factor to fit the size requirements, the total number of brands that each respective country has on this list will be divided by the country’s GDP. This will account for the amount of significant brand names for the size of the country’s economy.

It is important to note that brands, even though it was mentioned as an important factor for technology-seeking investments, were never directly used as a quantitative measurement in scientific literature. The Brand Finance Index was used in the Huang and Wang report to show the need for Chinese firms to acquire more internationally known brands; however, Huang and Wang did not use the index as a factor in their empirical research. It can be, however, found as a factor in the non-scientific publication *China Going Global Investment Index* by the Economist Intelligence Unit (2013:27).

#### 3.3.3.2. Technology

Since the other factors included in this list are also referred to under the technology umbrella, the “technology” factor will be more concerned with the available workforce within the countries with technological capacity (Dunning et al., 351, 2008). According to Dunning et al., the share of science and engineering doctorate graduates as a percentage of all university graduates is a way to approach the “technology” factor (2008:349). The 2011 OECD statistics were used to determine the percentage of science and engineering doctorate graduates from total doctorate graduates (*Graduates*). While the numbers were already equalized for their country sizes, they still needed to be equalized to fit within the index. Therefore, the percentage was divided again by 10 to meet this specific requirement and to not receive an inappropriate degree of importance in the index.

#### 3.3.3.3. Distribution Networks

The distribution network factor is important, as the investing countries can not only utilize the systems for the improvement of their businesses, but also gain knowledge that can be transferred to their home offices. While there were many dimensions of the importance of distribution networks for technology-seeking ODI, no quantitative factor for empirical research was given. Therefore, the most complete index found by the author was the Logistics Performance Index (LPI) produced by the World Bank. It looks at six facets of distribution networks, which include the “efficiency of customs and border clearance,” “quality of trade and transport infrastructure,” “ease of arranging competitively priced shipments,” “competence and quality of logistics,” “ability to track and trace consignments,” and “the frequency with which shipments reach consignees within schedules or expected delivery time” (World Bank, 2014). The 2015 data is given a score from 1 to 5, with 5 being the best possible score. As the countries were already equalized for size, the numbers just had to be equalized to fit the model. Therefore, the scores that the countries received from the LPI were divided by 500 (5, the highest number possible multiplied by 100) to stay within the parameters and to not inappropriately depict the degree of importance.

#### 3.3.3.4. Research and Development

The research and development (R&D) section of the index is unique, as it is sourced from two factors. The R&D section is in total worthy of 20%, unless noted, as the other TAI factors, and weights are distributed evenly into the two sections. The first section, titled “R&D as a percentage of GDP,” was compiled from the 2012 World Development Indicators of the World Bank (*World Development*). The expenditures tracked here are from both the government and private firms. As the indicator was already the proper size that accounts for country GDP size differences, equalization was not necessary.

The second half of the R&D factor is comprised of the amount of patent applications in a year. “Proprietary ownership advantage endowments can be proxied by the rate of patenting in the host country” (Buckley et al., 2007:505). However, in the same paper, it was found that this measure was not significant for Chinese ODI (Buckley et al., 2007:509). While this is worthy of noting, one must also realize that this report covered all types of ODI, not just technology-seeking type. Furthermore, the emergence of technology-seeking ODI clearly gained importance, as found in later reports, especially for the top type for manufacturing firms (Huang et al., 2013:93). The patent data was taken from the 2011 OECD.stat, which uses Patent Cooperation Treaty (PCT) statistics. The PCT is a part of the World Intellectual Property Organization, a self-funding agency of the United Nations (*Inside WIPO*). These statistics were utilized rather than statistics from home country offices to dispel a “home-field advantage”. To account for size differences in the countries’ economies, the amount of patents were judged against GDP in hundred millions of each of the countries. GDP in hundred millions was used in particular for the number to fit within the index.

#### 3.3.3.5. Managerial Competencies

As there is limited information regarding how foreign direct investors evaluate managerial competencies, a quantifiable metric was difficult to find. Therefore, since Dunning et al. had used graduates of science and engineering as a proxy for the technological potential of a country (2008:349), the author chose to use the number of high-ranking Master in Business Administration (MBA) schools as a proxy for managerial competencies. The data for this factor was sourced from the 2014 Financial Time’s Global MBA Ranking (*Global MBA*). This fac-

tor was used because it could signal not only the number of qualified managers graduating from top programs, but also the perception of the strength of a country's managerial competency. Both signals could attract investors who value this factor.

The number of schools was equalized to account for the size of the country's population, which would be assumed to be a factor in the supply of MBA programs to meet demand, and to ensure that it fits into the index. Thus, the factor is quantified as the number of top MBA programs per hundred thousand of the population.

#### 3.3.4. Entry Attractiveness Index (EAI)

While the factors contained in this section have little to do directly with technology, they will have an impact on how Chinese investors can enter a host country. What crucial here is how the technological attractiveness "interplays" with other factors, such as the government, human resources, and institutions of the host country (Lall, 1992:180). This "interplay" shows how well investments will be attracted and maintained (Lall, 1992:180-1). One aspect that a Chinese investor would likely consider is the cultural aspect, or as it will be referred to in this paper, the Openness to Chinese Culture (OCC). Furthermore, they would consider the ease of trade and state of trade relationships, factors that are quantified within the International Trade and Investment Environment section of the EAI.

##### 3.3.4.1. Openness to Chinese Culture

Dunning et al. mentioned in their book that assimilating to the other's culture is a lengthy and expensive process for both parties involved (2008:648). To assess the OCC, we will focus on the public opinion of China in the target country as well as the availability of qualified people to assimilate and grow the Chinese ODI. The original OCC factors and sources were found in the non-scientific findings of the Economist Intelligent Unit report *China Going Global Investment Index* (2013:28). This index utilizes factors called "percentage of the population viewing China favorably," "ethnic Chinese as a percentage of the population," "stock of Chinese born migrants," and "Chinese language use" (2013:28). Only the Chinese language use factor was discarded, as it only incorporated countries that have Chinese as an official language, which applies to neither target country in this research.

The "percentage of the population viewing China favorably" is a measure of not only openness, but also the risk of anti-China sentiment. For this factor, PEW data was used ("China Going Global", 2013:28). The full question asked was "Please tell me if you have a very favorable, somewhat favorable, somewhat unfavorable or very unfavorable opinion of China" (*Opinion of China*). From the answers they received, they were able to create the percentage that is included in our data. Something important to note is that "Favorable" is a combination of "very favorable" and "somewhat favorable" responses. "Unfavorable" combines "very unfavorable" and "somewhat unfavorable" (*Opinion of China*). As the population of both host countries was accounted for in the survey, the percentage had to be further divided by 10 to fit the index.

For "ethnic Chinese as a percentage of the population," the Overseas Community Affairs Council's data was used ("China Going Global", 2013:28). In scientific findings, Buckley et al. examined this factor by percentage of ethnic Chinese in the population (2007:506). In this research, Buckley et al. found that it was a highly significant factor and had a positive effect on Chinese ODI (2007:509). A similar factor, "stock of Chinese born migrants," was found in



the World Bank data (“China Going Global”, 2013:28). The research shows that while the overall host country cultural similarity to China may not be significant, the number of ethnic Chinese in a target country does have a significant impact (Quer et al., 2012: 1098-9). The Quer et al. team hypothesized that this was due to *guanxi*, which can be to some extent described a Chinese system of relationships and social rules, a key component for the Chinese when doing business (2012: 1099).

The “percentage of overseas ethnic Chinese” and “estimated stock of Chinese born migrants” factors are similar in the way that they are both used to see if there are local speakers of Chinese and those who understand the Chinese culture in a host country (“China Going Global,” 2013:24). Furthermore, they could also be used as a pool of potential recruits (“China Going Global,” 2013:24). Under the EAI, both factors will receive equal weight, unless noted. Both are examined as a percentage of the population to account for any country size differences. Furthermore, the numbers will be fit to the index.

#### 3.3.4.2. International Trade and Investment Environment

The International Trade and Investment Environment (ITIE) section of the EAI focuses on the open or closed nature of the host countries towards FDI in terms of policy and trade relationships. These are important factors since the direction of China’s FDI can be linked to how open the economies are and how the trade relationship is maintained (Dunning et al., 2008:665). The ITIE section is broken into two sections – Trade Issues and Investment Openness. Both sections were formulated after examining the Economist Intelligent Unit’s report titled *China Going Global Investment Index* (2013:28). The factors in the ITIE included from the report are the number of anti-dumping cases against China and whether or not there is a bilateral treaty in force.

The trade issues section will examine the disputes and issues that the countries have against each other, which would signal stress in their trade relationship. The unique aspect of this collection of factors is that they all count *against* the country’s overall score. This is because a relatively high number of issues could conceivably negatively impact the trading relationship. To equalize the size of each country’s economy, factors are graded upon the amount of business, here shown in imports, in which a country engages with China. This is used to equalize for the assumption that with increasing amount of trade, more issues arise. To maintain the consistency among data sources, the European Union’s data, including equalization numbers, are used to represent Germany.

The first trade issue discussed is the disputes among countries, which arises when a member government believes that another member government is violating an agreement or a commitment that it had made in the WTO (*WTO Dispute*). One factor will measure the amount of disputes that China receives from Germany (EU) or the USA. The second will measure the amount of disputes that Germany (EU) or the USA receives from China. Each will be given approximately 13% of the total ITIE weight, unless noted.

The second trade issue is called dumping, a practice when a firm exports a product at a price lower than the price it normally charges to its home market (WTO Anti-Dumping). Dumping can be seen as harmful, as it can cause unfair competition (Understanding the WTO). Suspi-

cion of dumping is normally sensed with a response of protective measures from the home country (Understanding the WTO). The factor received around 13% of the total weight of the ITIE, unless noted.

The openness of a country to FDI can help to account for variations in a country's success in attracting FDI (Nicoletti et al., 2003:8). Government policy, domestic and international, affects many aspects of foreign investment and technology attractiveness (Lall, 1992:182) and, therefore, is assumed to play a role in China's technology-seeking ODI.

One of the most sensitive issues added to a country's FDI restrictiveness is its concern for national security (Dunning et al., 2008:643). Because of this, FDI is often restricted from areas of strategic importance, such as broadcasting, telecommunications, and the energy sector (Dunning et al., 2008:642). While even very liberal countries have some restrictions in their "security-sensitive sectors," other countries, like the U.S. for example, have even more extensive restrictions (Dunning et al., 2008:643). To measure this, the 2014 OECD FDI Restrictiveness Index was employed. This index was designed to have 0 as the most open score, and 1 as the most restrictive score (Kalinova et al., 2010:9). Therefore, a more restrictive score will count against the attractiveness of a country.

Bilateral Investment Treaties, or BITs, are another measure of the host country's openness to FDI. BITs are designed to facilitate FDI from countries with abundant resources and capital, to less developed economies (Egger et al., 2004:789). From Egger et al.'s research, BITs that are ratified have a large effect on increasing FDI (2004:801). Having a treaty will count positively towards a country's final score. Like the other ITIE factors, this will receive 13% weight, unless noted.

### **3.4. Hypothesis 2 Results**

As the world's politics, economy, and people continue to evolve, the aforementioned indices must also be flexible. To demonstrate this phenomenon and to understand the impacts of a country's success in attracting technology-seeking Chinese FDI, different scenarios were used. Whichever factor or group is considered the most valuable within a scenario will be given the majority of the weight in order to show its dominance, but not the complete weight, so that the other factors may still be considered. Each of the scenarios will be first described individually. Later, they will be compared against the others, so that the differences between scenarios can be understood. The next sections will analyze what happened in each of the scenarios and the implications.

#### **3.4.1. Control Scenario**

The control scenario is the baseline scenario against which all other scenarios will be compared. Since it is assumed that technology-seeking Chinese ODI is more interested in the technological attractiveness of a country, the Technological Attractiveness Index (TAI) received the majority of the weight, or 66.(6)%. The Entry Attractiveness Index (EAI) received the rest, or 33.(3)%, of the weight. Within the Control TAI, each of the 5 technological factors received an equal share of the weight, or 20%. Under the EAI, each factor also received an equal share of the weight, around 13%.

#### 3.4.1.1. Technological Attractiveness Index

When observing the absolute numbers entered into the TAI, one can see that Germany and USA each win an equal number of categories – including an even splitting of the R&D section. However, after equalizers and weights are applied, Germany is the winner of this index with more points than the USA. However, this does not tell the whole story with every factor. Differences were minute in distribution network strength, R&D as a percentage of GDP, technology, and brand names. Germany was, however, the clear winner in the rate of patenting portion. A factor that the USA dominates, after equalizing and weighing, is in managerial competencies as calculated in this index.

#### 3.4.1.2. Entry Attractiveness Index

The first section of the EAI is the Openness to Chinese Culture check. The USA is the clear winner in both the original input numbers and the weighted ones. The closest factor that the two countries have is between the perceptions of China, with the USA viewing China slightly more favorable. The weighted difference in the amount of Chinese born migrants that are living in each country, relative to the population, and amounts of overseas ethnic Chinese relative to the population was larger, in favor of the USA.

In the International Trade and Investment Environment section, all factors count *against* the country's overall score. Within the Trade Issue section of International Trade and Investment Environment, Germany (EU) has the lowest number of trade issues with China per imports. The only area in which the USA fared better than Germany (EU) was in regards to the number of anti-dumping cases relative to imports. The other factors that Germany (EU) won were in regards to the number of disputes against China and disputes they received from China. Furthermore, countries that are more restrictive towards FDI tend to not receive as much FDI as the size of their economies would normally attract (Kalinova et al., 2010:6). In this factor, Germany (EU) was considered more open than the U.S., according to the OECD FDI Restrictiveness Index (*OECD FDI*).

The final factor considered in the International Trade and Investment Environment section is the presence or a lack of a Bilateral Investment Treaty (BIT) with China. This is a simple factor that gives the country either a positive score if the country has a treaty with China or no points if no treaty in place as of 2013. The information was sourced from the UN Conference of Trade and Development website (*Bilateral FDI*). Unlike the OECD FDI Restrictiveness Index, this score would be a positive addition to a country's overall score. Germany has a BIT with China so they receive a 1 (*Bilateral FDI*). The U.S., not having a BIT with China, receives a 0 in this factor (*Bilateral FDI*). Even though the U.S. performs poorly in the international trade and investment environment, it is still the winner of the Entry Attractiveness Index, as it is relatively strong in openness to Chinese culture.

#### 3.4.1.3. Total Chinese ODI Attractiveness Score

The final two groups, comprising of both Technological and Entry Attractiveness Indices, were compiled to reach a final score. In this control, the U.S. won with the higher score, as it has the particular advantage of managerial competencies and openness to Chinese culture. Areas in which the USA was relatively close to Germany was in the distribution networks score as well as R&D spending as a percentage of GDP. It is important to notice that USA's

win over Germany was extremely small and will make the results of further scenarios interesting to observe.<sup>4</sup>

#### 3.4.2. Scenario Tech

In the scenario of comparing the importance of each factor of the Technological Attractiveness Index, each factor deemed “the most important” was given a weight of 2/3 to signify its dominance. The remaining factors evenly shared the remaining 1/3 of the weight. This is assuming that they are still valuable, just not as much as the dominant factor. These scenarios will demonstrate how each factor impacts the country’s overall score: should a Chinese investor prefer one factor to the others. Each factor will become the dominant factor to see how it impacts a country’s overall attractiveness. TAI and EAI will remain at their respective amounts of 2/3, 1/3.<sup>5</sup>

The U.S. won four out of the five sub-scenarios, including managerial competencies, technology, distribution networks, and brand names. Germany was only able to win the R&D sub scenario. This means that even though Germany was stronger in more of those factors than the U.S., the USA has strengths throughout the index to outcompete Germany.

#### 3.4.3. Scenario Openness

In the scenario openness, in which the openness to Chinese culture is examined, the factors are intensified from being worthy of 30% of the EAI to 66%. Since the USA already had had a clear advantage in these factors, its win is not surprising, as the U.S. had already been strong in these factors and had previously won the control scenario.<sup>6</sup>

#### 3.4.4. Scenario Investment

In the scenario encompassing investment environment, the section “International Trade and Investment Environment” was given a weight of 66% in the EAI from 50%. Although Germany was the winner of four out of the five factors by having the lowest negative score, as in the tech scenarios, the U.S. benefited from having strengths in other areas of the index.<sup>7</sup>

#### 3.4.5. Scenario Entry

As the TAI was originally given the most importance throughout the experiment, this scenario flips the weights around on the two sub-indexes and gives the Entry Attractiveness Index 66% of the weight and the TAI the rest. In this view, the U.S. is the winner. The aspect of an entry scenario is unique because it is a mix of negative and positive numbers. Therefore, the resulting number will be low unless the country has a perfectly open FDI regulatory system and is without any trade issues. This is due to the nature of the index that could be improved upon further research.<sup>8</sup>

#### 3.4.6. Review of the Scenarios

In total, five unique scenarios were run. One of the main scenarios, technology, included 5 sub-scenarios to account for its different factors. It was found that although Germany had many winning factors throughout the index, it only won those areas by a small amount. More

---

<sup>4</sup> Please refer to Appendix B for the inputs and results of Control Scenario

<sup>5</sup> Please refer to Appendix C-F for the technology scenario inputs and results

<sup>6</sup> Please refer to Appendix G for scenario openness inputs and results

<sup>7</sup> Please refer to Appendix H for the investment scenario inputs and results

<sup>8</sup> Please refer to Appendix I for the entry scenario inputs and results

often, when the U.S. had won a factor, it usually had a larger gap from Germany. Therefore, even when running scenarios that seem to be in Germany's favor, the U.S. would win. It must still be mentioned that the differences are still not so pronounced that it is thinkable for Germany to become stronger in some of these factors in the near future.

### 3.5. Hypothesis 2 Interpretation

With this information at hand, the original question is brought up again – will Germany become a more attractive ODI location for China than the U.S.? It was concluded that no - the USA is a more attractive ODI location for China than Germany. However, this position is not guaranteed, as both Germany and the USA have the tools in place to make themselves more attractive to Chinese ODI. Therefore, the areas of education, culture and policy will greatly impact the country's attractiveness.

Education is important, but often overlooked, quality in generating technological attractiveness. While some literature uses it as a measure of technology (Dunning et al., 2008:349), there is no solid source of literature that explores this factor as a crucial component as the base of host country technological attractiveness. If the findings from this test are any indicator, education can be extremely powerful in differentiating a country's present technological attractiveness from its future outlook. As mentioned, there is no literature to fully support these ideas; however, it deserves further exploration, as technological attractiveness is or will be an important issue for many economies.

Each host government has recognized the need for an increase of science- and math-based education. Whether or not it is done to attract more ODI is not stated. In the USA, this initiative focuses on "STEM" education improvements over the next 10 years (*Science, Tech.*). STEM stands for Science, Technology, Engineering, and Mathematics (*Science, Tech.*). Interestingly enough, Germany also has a program to pursue specific objectives related to scientific and technological developments over a period of ten to fifteen years (*High-Tech*). As both countries are in the midst of these science and math based education plans, no definite results are known.

Openness to Chinese culture is another factor that both governments are exploring. Germany and China have a "Year of Language" program to encourage learning each other's mother tongue, which is promoted by the country leaders (*Bilateral Relations*). The U.S. also has a Chinese language learning initiative, called 100,000 Strong, to increase the number of Americans studying in China and learning the Mandarin Chinese language (*Future*). The USA also hosted in 2013 more students from China than any other country (*Future*).

Domestic policy can greatly impact the strength of the education and cultural openness of a country. Furthermore, the domestic policy can provide benefits, such as tax relief and investing assistance, for potential investors. Currently, both countries have investment promotion agencies, or IPAs. An IPA's goal is to increase investment interest in their home countries. There is also little room for complications in international relations, as both countries are relatively close in the EAI. Therefore, any changes in policies, whether they become more pro-investment with China or against it, will have a definite impact on the index and how potential Chinese investors view the countries.

## 4. Conclusion

### 4.1. Review

Presently, the literature regarding Chinese technology seeking ODI is available but not robust. This is not entirely surprising, as it is only a relatively recent phenomenon (Huang et al., 2013:103). However, the research is not only an interesting idea but also an important one to begin the understanding. In light of recent history, China is poised to become a large player in terms of FDI. Chinese investors have stepped outside of the typical forms of ODI by seeking technology, resources, and knowledge to build China a stronger nation. Even more so, they have entered highly industrialized countries, looking for ways to become more of a global player in terms of technology. As proven in the analysis, the USA and Germany are prime targets for this technology seeking ODI.

To begin, academia has some ideas explaining why China engages in technology ODI; however, there is not one agreed “shopping list” for Chinese firms seeking technology abroad. To further complicate matters, even if a so-called “shopping list” is found, there is not a consent way to measure the strength of a particular country in each factor.

The analysis section attempted to (a) create an index from a list of factors for Chinese technology seeking ODI, (b) give importance, in the form of weights, to each of the factors, and (c) test how two countries, Germany and the USA, are compared when confronted with varying importance in factors.

### 4.2. Research Findings

As the index was constructed in order to answer the question: Will Germany become a more successful technology seeking ODI location for China than the USA? It was proven that Germany and the U.S. were comparable countries for technology seeking ODI. The majority of the index’s initial focus was on comparing the two countries technological strengths, and secondary, their openness for FDI entry. To simulate the varying tastes of Chinese investors and the world economic and political environment, the importance or weights of different factors were adjusted. While both countries were close contenders, the USA ended up winning more of the scenarios than Germany, proving hypothesis 2 wrong.

While the competition was rather close, the implication of the research is clear. Education is an important base or a contributor for many of the factors on the index. The focus on science and engineering and management studies needs to be increased by countries that are looking to increase Chinese technology-seeking ODI. Both Germany and the U.S. are making inroads in this aspect. A high level of openness to the Chinese culture will also improve a country’s level of attractiveness. It can be used as a signal of how manageable and successful Chinese ODI will be in a host country. Domestic policy will play an important role in improving the attractiveness factors. Moreover, a country should consider what signals that the country is

sending to potential investing countries. This can be done through investment promotion agencies or FDI policies. Finally, the importance of a stable or advancing investment relationship with China is not to be overstated. This can greatly improve chances of receiving technology-seeking Chinese ODI.

### **4.3. Recommendation Highlights**

**Research Recommendations:** The overall suggestions from this research is to determine (a) if the factor is important, (b) if the indicator chosen for that factor is relevant, and (c) if the weight or equalization attributed to the factor is accurate.

**Business Recommendations:** Regardless if businesses are looking to invest or looking to receive investments, businesses should take stock of what they have and what they need. Factors including their technology requirements, cultural competencies, and ability to enter a market should all be considered, not just the technology needs. By this inventory check, businesses should be able to identify the country in which they have the best chance of achieving their goals.

**Domestic Policy Recommendations:** The policy recommendations were aimed at education, cultural openness, and investment attraction. With strengthened these factors, the countries looking to attract technology-seeking Chinese ODI will be better positioned.

### **4.4. Limitations of Research**

#### **4.4.1. Conflicting and Unavailable Data Set**

A major limitation throughout the research was the lack of appropriate factors for technology-seeking ODI from China. Therefore, many assumptions were made in order to build the data set. Therefore, more research could be conducted in order to determine the significance of these assumed factors for Chinese technology-seeking ODI. As discussed in the literature review, it is not a unanimous agreement in the literature that culture is a significant factor in Chinese technology seeking ODI. However, further research on technological investments, especially by surveying Chinese managers making these decisions, should be able to uncover the motives.

#### **4.4.2. Miscellaneous**

As a brand names limitation, there are other firms that also create such lists for brand power, strength, and value. Furthermore, only the number of brands on the list was considered. Average listing number, total value, or average value could also have been used to measure the value of a country's brands

One of the limitations of the cultural openness factor is the potential ambiguity of the Pew survey. While the Pew survey is an interesting factor, the survey questions have the limitation of simply gauging a country's view of "China," which could mean anything from the customs, the business style, the people, to the Communist Party. Therefore, this may not be the best way to judge how many people favorably view doing business with China. A more in-depth

and specific survey, especially among American and German managers, could provide a better picture of doing business in the respective host countries.

An aspect of scenario entry to consider is that with the mix of negative and positive numbers, the number results will be low unless the country has a perfectly open FDI regulatory system and is without Trade Issues. This is a limitation in this scenario. In future research, if the negative factors could be grouped and separated from the positive factors, this may resolve the issue.

The final miscellaneous limitation is the author's bias as an American. It is possible that her cultural viewpoint may inadvertently skew the factors chosen. Living in Germany is also a possible influencer. This was apparent in the analysis section. Instead of checking to ensure that Germany or the U.S. had more technological factors than China, the author assumed that they would. Future research should not assume that if a country is looking for technology through ODI that they themselves have not already possessed some. An outside reviewer, perhaps one with Chinese background or even a neutral background, would have added a different perspective.

#### **4.5. Future Outlook**

China's growing strength in ODI is not expected to stop soon. However, the way in which China currently conducts ODI and how Chinese investors plan on doing so in the future is not exactly known. China is unique that the ODI is conducted in a way to maximize the benefit of its future (Deng, 2003:119-20). Therefore, it is not sufficient to apply existing thoughts and models of ODI to the case of China. The way in which ODI from China occurs has been evolving and will continue to do so. Regardless of where China goes, the relationships between the countries will be important, not just for the parties involved, but the world as a whole. When writing about the future outlook of the subject in their book in 2008, Dunning et al. expressed that, "a scenario of economic growth and political stability will require close cooperation between China, the U.S., and the EU" (748).



## Sources

Arvis, Jean-François, et al.. *Connecting to Compete 2014: Trade Logistics in the Global Economy*. Publication. 2014 ed. Washington DC: International Bank for Reconstruction and Development/The World Bank, 2014. *Logistics Performance Index and Its Indicators*. The World Bank, 2014. Web. 07 Aug. 2014

Baker & McKenzie. "Bird's-Eye View: Chinese Investment into Europe and North America (2016).

Balassa, Bela, and Marcus Noland. ""Revealed" Comparative Advantage in Japan and the United States." *Journal of Economic Integration* 4.2 (1989): 8-15. Web.

"Bilateral FDI Statistics." *United Nations Conference on Trade and Development*. UNCTAD, 2014. Web. 26 August 2014

"Bilateral Relations - China." *Auswärtiges Amt*. Auswärtiges Amt, 2014. Web. 25 Aug. 2014.

Buckley, Peter J., L. Jeremy Clegg, Adam R. Cross, Xin Liu, Hinrich Voss, and Ping Zheng. "The Determinants of Chinese Outward Foreign Direct Investment." *Journal of International Business Studies* 38.4 (2007): 499-518. Print.

Buckley, Peter J., Adam R. Cross, Hui Tan, Liu Xin, and Hinrich Voss. "Historic and Emergent Trends in Chinese Outward Direct Investment." *MIR: Management International Review* 48.6 (2008): 715-48.

Cheung, Yin-Wong, and Xingwang Qian. "Empirics of China's Outward Direct Investment." *Pacific Economic Review* 14.3 (2009): 312-41.

*China Going Global Investment Index: A Report from the Economist Intelligence Unit*. Publication. N.p.: Economist Intelligence Unit Limited, 2013. *The Economist Intelligence Unit /China Going Global Investment Index*. The Economist Intelligence Unit Limited, 2013. Web. 17 July 2014

"Country Comparison :: Population." *Central Intelligence Agency*. Central Intelligence Agency, July 2014. Web. 27 Aug. 2014.

Dunning, John H., and Serianna M. Lundan. *Multinational Enterprises and the Global Economy*. 2nd ed. Cheltenham: Edward Elgar, 2008. 29+.

Deng, Ping. "Foreign Investment by Multinationals from Emerging Countries: The Case of China." *Journal of Leadership & Organizational Studies* 10.2 (2003): 113-24.

Egger, Peter, and Michael Pfaffermayr. "The Impact of Bilateral Investment Treaties on Foreign Direct Investment." *Journal of Comparative Economics* 32.4 (2004): 788-804. *ProQuest*. Web. 23 Aug. 2014.

Fagerberg, Jan, and Bart Verspagen. "Technology-Gaps, Innovation-Diffusion and Transformation: An Evolutionary Interpretation." *Research Policy* 31.8 (2002): 1291-304. *ProQuest*. Web. 11 Aug. 2014.

"Future of U.S.-China Relations, The." *U.S. Department of State*. The Office of Website Management, Bureau of Public Affairs, 25 June 2014. Web. 19 Aug. 2014.

Fung, K. C., Garcia-Herrero, A., & Siu, A. (2009). A comparative empirical examination of outward foreign direct investment from four asian economies: People's republic of china; japan; republic of korea; and taipei,china. *Asian Development Review*, 26(2), 86-101.

"Global 500 2015 - The World's Most Valuable Brands." *Brand Directory*. Brand Finance, 2015. Web. 29 Dec. 2015.

"Global MBA Ranking 2015." *The Financial Times*. The Financial Times LTD, Jan. 2015. Web. 29 Dec. 2015.

"Graduates by Field." OECD.Stat. *OECD.Stat*. OECD, 2014. Web. 29 Dec. 2015.

Greenup, K., and Löchel, H. (2015), The relative attractiveness of Germany and the United States for Chinese investments, *Today's Manager*, No. 1.

"High-Tech Strategy for Germany, The." *The High-Tech Strategy for Germany*. Bundesministerium Für Bildung Und Forschung, 2012. Web. 19 Aug. 2014.

Huang, Yiping, and Bijun Wang. "Investing Overseas Without Moving Factories Abroad: The Case of Chinese Outward Direct Investment." *Asian Development Review* 30.1 (2013): 85-107.

"Inside WIPO." *World Intellectual Property Organization*. Web. 22 Aug. 2014.

"International Offices." *GTAI -International Offices*. Germany Trade & Invest, 2014. Web. 26 Aug. 2014.

Kalinova, B., A. Palerm and S. Thomsen (2010), "OECD's FDI Restrictiveness Index: 2010 Update", *OECD Working Papers on International Investment*, No. 2010/03, OECD Publishing.

Lall, Sanjaya. "Technological Capabilities and Industrialization." *World Development* 20.2 (1992): 165-86. Print.

Makino, S., Chung-Ming, L., & Yeh, R. (2002). Asset-exploitation versus asset-seeking: Implications for location choice of foreign direct investment from newly industrialized economies. *Journal of International Business Studies*, 33(3), 403-421.

"Member Information - China and the WTO." WORLD TRADE ORGANIZATION, 2014. Web. 18 Aug. 2014.

Nicoletti, Giuseppe, Stephen Golub, Dana Hajkova, Daniel Mirza and Kwang-Yeoul Yoo (2003), "Policies and international integration: influences on trade and foreign direct investment", *OECD Economics Department Working Papers*, No. 359.

"OECD FDI Restrictiveness Index." OECD.Stat. *OECD.Stat.* OECD, 2014. Web. 29 Dec. 2015.

*Opinion of China – Do you have a favorable or unfavorable view of China.* Pew Research Center, Washington, D.C. (2015), Web. 29 Dec. 2015.

*Overseas Community Affairs Statistic.* Rep. Overseas Community Affairs Council, Republic of China (Taiwan), 20 Feb. 2014. Web. 31 July 2014.

Quer, Diego, Enrique Claver, and Laura Rienda. "Political Risk, Cultural Distance, and Outward Foreign Direct Investment: Empirical Evidence from Large Chinese Firms." *Asia Pacific Journal of Management* 29.4 (2012): 1089-104.

"Patents by Region Dataset." OECD.Stat. *OECD.Stat.* OECD, 2014. Web. 06 Mar. 2016.

"R&D as a % of GDP - World Development Indicators." *World DataBank.* The World Bank. 2014. Web. 06 Mar. 2016

"Science, Technology, Engineering and Math: Education for Global Leadership." U.S. Department of Education, 03 June 2014. Web. 17 Aug. 2014.

"Trade Profiles." *Trade Profiles.* World Trade Organization. 2015. Web. 29 Dec. 2015.

"U.S. Relations With China." *U.S. Department of State.* Office of Website Management, Bureau of Public Affairs, 16 Aug. 2013. Web. 19 Aug. 2014.

"Understanding the WTO: The Agreements." World Trade Organization, 2014. Web. 14 Aug. 2014.

"Country-Specific Lists of Bilateral Investment Treaties." UNCTAD. N.p., 01 June 2013. Web. 06 Mar. 2016.

Wong, John, and Sarah Chan. "China's Outward Direct Investment: Expanding Worldwide." *China: An International Journal* 1.2 (2003): 273-301. Web.

"World Development Indicators." *World DataBank.* The World Bank. 2014. Web. 06 Mar. 2016.

"WTO Dispute Settlement." *World Trade Organization* World Trade Organization, 2016. Web. 06 Mar. 2016.

"WTO Anti-Dumping Gateway." *World Trade Organization* World Trade Organization, 2016. Web. 06 Mar. 2016.

“WTO Trade Monitoring Database.” *World Trade Organization* World Trade Organization 2016. Web. 06 Mar. 2016.

Zhan, James, Richard Bolwijn, Bruno Casella, Joseph Clements, Hamed El Kady, Kumi Endo, Masataka Fujita, Noelia Garcia Nebra, Thomas Van Giffen, Axèle Giroud, Ariel Ivanier, Joachim Karl, Guoyong Liang, Anthony Miller, Hafiz Mirza, Nicole Moussa, Shin Ohinata, Davide Rigo, Sergey Ripinsky, William Speller, Astrit Sulstarova, Claudia Trentini, Elisabeth Tuerk, Jörg Weber, and Kee Hwee Wee. *World Investment Report*. Rep. 2013 ed. N.p.: United Nations, 2013.

## Appendix A: Sources of Index Factors

Technological Attractiveness Index	<i>Source (In-text Citation Format)</i>
Brand Names	<i>(Global 500)</i>
Technology	<i>(Graduates )*</i>
Distribution Networks	<i>(Arvis et al., 2013:viii)</i>
R&D: as a % of GDP	<i>(R&amp;D as a%)</i>
R&D: rate of patenting	<i>(Patents by Region )</i>
Managerial Competencies	<i>(Global MBA)</i>
Total Technological Attractiveness Index	
Entry Attractiveness Index	
Openness to Chinese Culture	
% of the population viewing China favorably	<i>(Opinion of China )</i>
% of Overseas Ethnic Chinese	<i>(“China Going Global,” 2013:24)</i>
Stock of Chinese born migrants	<i>(Overseas Community )</i>
International Trade and Investment Environment	
Trade Issues	
Number of disputes against China	<i>(WTO Disputes)</i>
Number of disputes against Germany/USA from China	<i>(WTO Disputes)</i>
Number of anti-dumping cases against China	<i>(WTO Trade)</i>
Investment Openness	
OECD FDI Restrictiveness Index score	<i>(OECD FDI)</i>
Bilateral investment treaty with China in force	<i>(Country Specific)</i>
Other	
Population	<i>(Country Comparison )</i>
GDP	<i>(Trade Profiles )</i>
Import Data	<i>(Trade Profiles )</i>

## Appendix B: S Control

	Germany	USA			Germany	USA		Germany	USA		Notes
Technological Attractiveness Index	Original Numbers	Difference	Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
Brand Names	30	194	164	billion GDP	0,0081	0,0111	20%	0,0016	0,0022	0,0006	
Technology	0,43866171	0,41442868	0,02423303	10	0,0439	0,0414	20%	0,0088	0,0083	0,0005	2013, OECD Drs
Distribution Networks	4,12	3,92	0,2	500	0,0082	0,0078	20%	0,00165	0,00157	0,00008	that the ratio was still
R&D: as a % of GDP	2,9191	2,79197	0,12713	-	0,0292	0,0279	10%	0,0029	0,0028	0,0001	Already as percent of GDP
R&D: rate of patenting	23197,9628	32116,0858	8918,123	GDP PPP hundred millions	0,0629	0,0184	10%	0,0063	0,0018	0,0044	adjusted for GDP in hundred millions PPP
Managerial Competencies	2,00	50,00	48	Country Population	0,00	0,02	20%	0,0005	0,0031	0,0026	adjusted per million of the population
Total Technological Attractiveness Index					0,1548	0,1223	100%	0,0217	0,0198	0,0019	100%
Entry Attractiveness Index	Original Numbers	Difference	Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
Openness to Chinese Culture											
% of the population viewing China favorably	34%	38%	0,04	10	0,0340	0,0380	13%	0,0043	0,0048	0,0005	1 = most favorable: adjusted to
% of Overseas Ethnic Chinese	90.000	4.240.000	4.150.000	Country Population	0,0011	0,0132	13%	0,0001	0,0016	0,0015	2012, Overseas Community Affairs Statistics; equalize to not give the factor extra importance
Stock of Chinese born migrants	97.786	2.383.831	2.286.045	Country Population	0,0121	0,0742	13%	0,0015	0,0093	0,0078	In tens of millions
International Trade and Investment Environment											
Trade Issues											
Number of disputes against China	7	17	10	Per Chinese	-0,0189	-0,0355	13%	-0,0024	-0,0044	0,0021	Germany as part of the EU; in relation to amount of Chinese imports
Number of disputes against Germany/USA from China	4	9	5	Per Imports	-0,0108	-0,0188	13%	-0,0013	-0,0023	0,0010	Germany as part of the EU; in relation to US/EU imports
Number of anti-dumping cases against China	119	124	5	Per Chinese	-0,0321	-0,0259	13%	-0,0040	-0,0032	0,0008	Germany as part of the EU; in relation to amount of Chinese imports
Investment Openness											
OECD FDI Restrictiveness Index score	0,023	0,089	0,066	10	-0,0023	-0,0089	13%	-0,00029	-0,00111	0,0008	1 = closed; 0 = open
Bilateral investment treaty with China in force	1	0	1	100	0,01	0	13%	0,0013	0,0000	0,0013	1 = yes; 0 = no - in PDF
Total International Trade and Investment Environment Score:								-0,0068	-0,0111	0,0044	
Total Entry Attractiveness					-0,0069	0,0364	100%	-0,0009	0,0045	0,0054	
	Germany	USA			Germany	USA					
	Pre - Weighted		Weight	Final Weighted Score	Difference						
Technological Attractiveness Index	0,0217	0,0198	0,0019167	66,67%	0,0145	0,0132	0,0012778				
Entry Attractiveness Index	-0,0009	0,0045	0,00540473	33,33%	-0,0003	0,0015	0,0018016				
Total Score	0,0209	0,0244		100%	0,0142	0,0147	0,00052				

## Appendix C: S Tech Brand Names

	Germany	USA			Germany	USA		Germany	USA		Notes
Technological Attractiveness Index	Original Numbers	Difference	Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
Brand Names	30	194	164	billion GDP	0,0081	0,0111	66,67%	0,0054	0,0074	0,0020	
Technology	0,43866171	0,41442868	0,02423303	10	0,0439	0,0414	8,33%	0,0037	0,0035	0,0002	2013, OECD Drs
Distribution Networks	4,12	3,92	0,2	500	0,0082	0,0078	8,33%	0,00069	0,00065	0,00003	that the ratio was still
R&D: as a % of GDP	2,9191	2,79197	0,12713	-	0,0292	0,0279	4,17%	0,0012	0,0012	0,0000	Already as percent of GDP
R&D: rate of patenting	23197,9628	32116,0858	8918,123	GDP PPP hundred millions	0,0629	0,0184	4,17%	0,0026	0,0008	0,0019	adjusted for GDP in hundred millions PPP
Managerial Competencies	2,00	50,00	48	Country Population	0,00	0,02	8,33%	0,0002	0,0013	0,0011	adjusted per million of the population
Total Technological Attractiveness Index					0,1548	0,1223	100%	0,0138	0,0148	-0,0010	100%
Entry Attractiveness Index	Germany	USA			Germany	USA		Germany	USA		
Openness to Chinese Culture	Original Numbers	Difference	Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
% of the population viewing China favorably	34%	38%	0,04	10	0,0340	0,0380	13%	0,0043	0,0048	0,0005	1 = most favorable: adjusted to
% of Overseas Ethnic Chinese	90.000	4.240.000	4.150.000	Country Population	0,0011	0,0132	13%	0,0001	0,0016	0,0015	2012, Overseas Community Affairs Statistics; equalize to not give the factor extra importance
Stock of Chinese born migrants	97.786	2.383.831	2.286.045	Country Population	0,0121	0,0742	13%	0,0015	0,0093	0,0078	In tens of millions
International Trade and Investment Environment											
Trade Issues											
Number of disputes against China	7	17	10	Per Chinese	-0,0189	-0,0355	13%	-0,0024	-0,0044	0,0021	Germany as part of the EU; in relation to amount of Chinese imports
Number of disputes against Germany/USA from China	4	9	5	Per Imports	-0,0108	-0,0188	13%	-0,0013	-0,0023	0,0010	Germany as part of the EU; in relation to US/EU imports
Number of anti-dumping cases against China	119	124	5	Per Chinese	-0,0321	-0,0259	13%	-0,0040	-0,0032	0,0008	Germany as part of the EU; in relation to amount of Chinese imports
Investment Openness											
OECD FDI Restrictiveness Index score	0,023	0,089	0,066	10	-0,0023	-0,0089	13%	-0,00029	-0,00111	0,0008	1 = closed; 0 = open
Bilateral investment treaty with China in force	1	0	1	100	0,01	0	13%	0,0013	0,0000	0,0013	1 = yes; 0 = no - in PDF
Total International Trade and Investment Environment Score:								-0,0068	-0,0111	0,0044	
Total Entry Attractiveness					-0,0069	0,0364	100%	-0,0009	0,0045	0,0054	
	Germany	USA			Germany	USA					
	Pre - Weighted			Weight	Final Weighted Score	Difference					
Technological Attractiveness Index	0,0138	0,0148	0,00095536	66,67%	0,0092	0,0098	0,0006369				
Entry Attractiveness Index	-0,0009	0,0045	0,00540473	33,33%	-0,0003	0,0015	0,0018016				
Total Score	0,0129	0,0193		100%	0,0089	0,0114	0,00244				

## Appendix C: S Tech Technology

	Germany	USA			Germany	USA		Germany	USA		Notes
Technological Attractiveness Index	Original Numbers		Difference	Equalizer	Adjusted		Weight	Pre - Weighted		Difference	
Brand Names	30	194	164	billion GDP	0,0081	0,0111	8,33%	0,0007	0,0009	0,0003	
Technology	0,43866171	0,41442868	0,02423303	10	0,0439	0,0414	66,67%	0,0292	0,0276	0,0016	2013, OECD Drs
Distribution Networks	4,12	3,92	0,2	500	0,0082	0,0078	8,33%	0,00069	0,00065	0,00003	that the ratio was still
R&D: as a % of GDP	2,9191	2,79197	0,12713	-	0,0292	0,0279	4,17%	0,0012	0,0012	0,0001	Already as percent of GDP
R&D: rate of patenting	23197,9628	32116,0858	8918,123	GDP PPP hundred millions	0,0629	0,0184	4,17%	0,0026	0,0008	0,0019	adjusted for GDP in hundred millions PPP
Managerial Competencies	2,00	50,00	48	Country Population	0,00	0,02	8,33%	0,0002	0,0013	0,0011	adjusted per million of the population
Total Technological Attractiveness Index					0,1548	0,1223	100%	0,0347	0,0324	0,0022	100%
	Germany	USA			Germany	USA		Germany	USA		
Entry Attractiveness Index	Unadjusted/Original Number			Equalizer	Adjusted		Weight	Pre - Weighted		Difference	
Openness to Chinese Culture											
% of the population viewing China favorably	34%	38%	0,04	10	0,0340	0,0380	13%	0,0043	0,0048	0,0005	1 = most favorable: adjusted to
% of Overseas Ethnic Chinese	90.000	4.240.000	4.150.000	Country Population	0,0011	0,0132	13%	0,0001	0,0016	0,0015	2012, Overseas Community Affairs Statistics; equalize to not give the factor extra importance
Stock of Chinese born migrants	97.786	2.383.831	2.286.045	Country Population	0,0121	0,0742	13%	0,0015	0,0093	0,0078	In tens of millions
International Trade and Investment Environment											
Trade Issues											
Number of disputes against China	7	17	10	Per Chinese	-0,0189	-0,0355	13%	-0,0024	-0,0044	0,0021	Germany as part of the EU; in relation to amount of Chinese imports
Number of disputes against Germany/USA from China	4	9	5	Per Imports	-0,0108	-0,0188	13%	-0,0013	-0,0023	0,0010	Germany as part of the EU; in relation to US/EU imports
Number of anti-dumping cases against China	119	124	5	Per Chinese	-0,0321	-0,0259	13%	-0,0040	-0,0032	0,0008	Germany as part of the EU; in relation to amount of Chinese imports
Investment Openness											
OECD FDI Restrictiveness Index score	0,023	0,089	0,066	10	-0,0023	-0,0089	13%	-0,00029	-0,00111	0,0008	1 = closed; 0 = open
Bilateral investment treaty with China in force	1	0	1	100	0,01	0	13%	0,0013	0,0000	0,0013	1 = yes; 0 = no - in PDF
Total International Trade and Investment Environment Score:								-0,0068	-0,0111	0,0044	
Total Entry Attractiveness					-0,0069	0,0364	100%	-0,0009	0,0045	0,0054	
	Germany	USA			Germany	USA					
	Pre - Weighted			Weight	Final Weighted Score		Difference				
Technological Attractiveness Index	0,0347	0,0324	0,00221222	66,67%	0,0231	0,0216	0,0014748				
Entry Attractiveness Index	-0,0009	0,0045	0,00540473	33,33%	-0,0003	0,0015	0,0018016				
Total Score	0,0338	0,0370		100%	0,0228	0,0231	0,00033				



## Appendix D: S Tech Distribution Networks

	Germany	USA			Germany	USA		Germany	USA		Notes
Technological Attractiveness Index	Original Numbers	Difference	Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
Brand Names	30	194	164	billion GDP	0,0081	0,0111	8,33%	0,0007	0,0009	0,0003	
Technology	0,43866171	0,41442868	0,02423303	10	0,0439	0,0414	8,33%	0,0037	0,0035	0,0002	2013, OECD Drs
Distribution Networks	4,12	3,92	0,2	500	0,0082	0,0078	66,67%	0,00549	0,00523	0,00027	that the ratio was still
R&D: as a % of GDP	2,9191	2,79197	0,12713	-	0,0292	0,0279	4,17%	0,0012	0,0012	0,0001	Already as percent of GDP
R&D: rate of patenting	23197,9628	32116,0858	8918,123	GDP PPP hundred millions	0,0629	0,0184	4,17%	0,0026	0,0008	0,0019	adjusted for GDP in hundred millions PPP
Managerial Competencies	2,00	50,00	48	Country Population	0,00	0,02	8,33%	0,0002	0,0013	0,0011	adjusted per million of the population
Total Technological Attractiveness Index					0,1548	0,1223	100%	0,0139	0,0128	0,0010	100%
	Germany	USA			Germany	USA		Germany	USA		
Entry Attractiveness Index	adjusted/Original Number		Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
Openness to Chinese Culture											
% of the population viewing China favorably	34%	38%	0,04	10	0,0340	0,0380	13%	0,0043	0,0048	0,0005	1 = most favorable: adjusted to
% of Overseas Ethnic Chinese	90.000	4.240.000	4.150.000	Country Population	0,0011	0,0132	13%	0,0001	0,0016	0,0015	2012, Overseas Community Affairs Statistics; equalize to not give the factor extra importance
Stock of Chinese born migrants	97.786	2.383.831	2.286.045	Country Population	0,0121	0,0742	13%	0,0015	0,0093	0,0078	In tens of millions
International Trade and Investment Environment											
Trade Issues											
Number of disputes against China	7	17	10	Per Chinese	-0,0189	-0,0355	13%	-0,0024	-0,0044	0,0021	Germany as part of the EU; in relation to amount of Chinese imports
Number of disputes against Germany/USA from China	4	9	5	Per Imports	-0,0108	-0,0188	13%	-0,0013	-0,0023	0,0010	Germany as part of the EU; in relation to US/EU imports
Number of anti-dumping cases against China	119	124	5	Per Chinese	-0,0321	-0,0259	13%	-0,0040	-0,0032	0,0008	Germany as part of the EU; in relation to amount of Chinese imports
Investment Openness											
OECD FDI Restrictiveness Index score	0,023	0,089	0,066	10	-0,0023	-0,0089	13%	-0,00029	-0,00111	0,0008	1 = closed; 0 = open
Bilateral investment treaty with China in force	1	0	1	100	0,01	0	13%	0,0013	0,0000	0,0013	1 = yes; 0 = no - in PDF
Total International Trade and Investment Environment Score:								-0,0068	-0,0111	0,0044	
Total Entry Attractiveness					-0,0069	0,0364	100%	-0,0009	0,0045	0,0054	
	Germany	USA			Germany	USA					
	Pre - Weighted		Weight	Final Weighted Score	Difference						
Technological Attractiveness Index	0,0139	0,0128	0,00103196	66,67%	0,0092	0,0086	0,000688				
Entry Attractiveness Index	-0,0009	0,0045	0,00540473	33,33%	-0,0003	0,0015	0,0018016				
Total Score	0,0130	0,0174		100%	0,0090	0,0101	0,00111				

## Appendix E: S Tech R&D

	Germany	USA			Germany	USA		Germany	USA		Notes
Technological Attractiveness Index	Original Numbers	Difference	Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
Brand Names	30	194	164	billion GDP	0,0081	0,0111	8%	0,0007	0,0009	0,0003	
Technology	0,43866171	0,41442868	0,02423303	10	0,0439	0,0414	8%	0,0037	0,0035	0,0002	2013, OECD Drs
Distribution Networks	4,12	3,92	0,2	500	0,0082	0,0078	8%	0,00069	0,00065	0,00003	that the ratio was still
R&D: as a % of GDP	2,9191	2,79197	0,12713	-	0,0292	0,0279	33%	0,0097	0,0093	0,0004	Already as percent of GDP
R&D: rate of patenting	23197,9628	32116,0858	8918,123	GDP PPP hundred millions	0,0629	0,0184	33%	0,0210	0,0061	0,0148	adjusted for GDP in hundred millions PPP
Managerial Competencies	2,00	50,00	48	Country Population	0,00	0,02	8%	0,0002	0,0013	0,0011	adjusted per million of the population
Total Technological Attractiveness Index					0,1548	0,1223	100%	0,0359	0,0218	0,0141	100%
	Germany	USA			Germany	USA		Germany	USA		
Entry Attractiveness Index	Unadjusted/Original Number		Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
Openness to Chinese Culture											
% of the population viewing China favorably	34%	38%	0,04	10	0,0340	0,0380	13%	0,0043	0,0048	0,0005	1 = most favorable: adjusted to
% of Overseas Ethnic Chinese	90.000	4.240.000	4.150.000	Country Population	0,0011	0,0132	13%	0,0001	0,0016	0,0015	2012, Overseas Community Affairs Statistics; equalize to not give the factor extra importance
Stock of Chinese born migrants	97.786	2.383.831	2.286.045	Country Population	0,0121	0,0742	13%	0,0015	0,0093	0,0078	In tens of millions
International Trade and Investment Environment											
Trade Issues											
Number of disputes against China	7	17	10	Per Chinese	-0,0189	-0,0355	13%	-0,0024	-0,0044	0,0021	Germany as part of the EU; in relation to amount of Chinese imports
Number of disputes against Germany/USA from China	4	9	5	Per Imports	-0,0108	-0,0188	13%	-0,0013	-0,0023	0,0010	Germany as part of the EU; in relation to US/EU imports
Number of anti-dumping cases against China	119	124	5	Per Chinese	-0,0321	-0,0259	13%	-0,0040	-0,0032	0,0008	Germany as part of the EU; in relation to amount of Chinese imports
Investment Openness											
OECD FDI Restrictiveness Index score	0,023	0,089	0,066	10	-0,0023	-0,0089	13%	-0,00029	-0,00111	0,0008	1 = closed; 0 = open
Bilateral investment treaty with China in force	1	0	1	100	0,01	0	13%	0,0013	0,0000	0,0013	1 = yes; 0 = no - in PDF
Total International Trade and Investment Environment Score:								-0,0068	-0,0111	0,0044	
Total Entry Attractiveness					-0,0069	0,0364	100%	-0,0009	0,0045	0,0054	
	Germany	USA			Germany	USA					
	Pre - Weighted		Weight	Final Weighted Score	Difference						
Technological Attractiveness Index	0,0359	0,0218	0,01412888	66,67%	0,0239	0,0145	0,0094193				
Entry Attractiveness Index	-0,0009	0,0045	0,00540473	33,33%	-0,0003	0,0015	0,0018016				
Total Score	0,0351	0,0263		100%	0,0237	0,0160	0,00762				

## Appendix F: S Tech Managerial Competencies

	Germany	USA			Germany	USA		Germany	USA		Notes
Technological Attractiveness Index	Original Numbers		Difference	Equalizer	Adjusted		Weight	Pre - Weighted		Difference	
Brand Names	30	194	164	billion GDP	0,0081	0,0111	8,33%	0,0007	0,0009	0,0003	
Technology	0,43866171	0,41442868	0,02423303	10	0,0439	0,0414	8,33%	0,0037	0,0035	0,0002	2013, OECD Drs
Distribution Networks	4,12	3,92	0,2	500	0,0082	0,0078	8,33%	0,00069	0,00065	0,00003	that the ratio was still
R&D: as a % of GDP	2,9191	2,79197	0,12713	-	0,0292	0,0279	4,17%	0,0012	0,0012	0,0000	Already as percent of GDP
R&D: rate of patenting	23197,9628	32116,0858	8918,123	GDP PPP hundred millions	0,0629	0,0184	4,17%	0,0026	0,0008	0,0019	adjusted for GDP in hundred millions PPP
Managerial Competencies	2,00	50,00	48	Country Population	0,00	0,02	66,67%	0,0016	0,0104	0,0087	adjusted per million of the population
Total Technological Attractiveness Index					0,1548	0,1223	100%	0,0105	0,0173	-0,0068	100%
	Germany	USA			Germany	USA		Germany	USA		
Entry Attractiveness Index	Unadjusted/Original Number			Equalizer	Adjusted		Weight	Pre - Weighted		Difference	
Openness to Chinese Culture											
% of the population viewing China favorably	34%	38%	0,04	10	0,0340	0,0380	13%	0,0043	0,0048	0,0005	1 = most favorable: adjusted to
% of Overseas Ethnic Chinese	90.000	4.240.000	4.150.000	Country Population	0,0011	0,0132	13%	0,0001	0,0016	0,0015	2012, Overseas Community Affairs Statistics; equalize to not give the factor extra importance
Stock of Chinese born migrants	97.786	2.383.831	2.286.045	Country Population	0,0121	0,0742	13%	0,0015	0,0093	0,0078	In tens of millions
International Trade and Investment Environment											
Trade Issues											
Number of disputes against China	7	17	10	Per Chinese	-0,0189	-0,0355	13%	-0,0024	-0,0044	0,0021	Germany as part of the EU; in relation to amount of Chinese imports
Number of disputes against Germany/USA from China	4	9	5	Per Imports	-0,0108	-0,0188	13%	-0,0013	-0,0023	0,0010	Germany as part of the EU; in relation to US/EU imports
Number of anti-dumping cases against China	119	124	5	Per Chinese	-0,0321	-0,0259	13%	-0,0040	-0,0032	0,0008	Germany as part of the EU; in relation to amount of Chinese imports
Investment Openness											
OECD FDI Restrictiveness Index score	0,023	0,089	0,066	10	-0,0023	-0,0089	13%	-0,00029	-0,00111	0,0008	1 = closed; 0 = open
Bilateral investment treaty with China in force	1	0	1	100	0,01	0	13%	0,0013	0,0000	0,0013	1 = yes; 0 = no - in PDF
Total International Trade and Investment Environment Score:								-0,0068	-0,0111	0,0044	
Total Entry Attractiveness					-0,0069	0,0364	100%	-0,0009	0,0045	0,0054	
	Germany	USA			Germany	USA					
	Pre - Weighted			Weight	Final Weighted Score		Difference				
Technological Attractiveness Index	0,0105	0,0173	0,00683421	66,67%	0,0070	0,0116	0,0045561				
Entry Attractiveness Index	-0,0009	0,0045	0,00540473	33,33%	-0,0003	0,0015	0,0018016				
Total Score	0,0096	0,0219		100%	0,0067	0,0131	0,00636				

## Appendix G: S Openness

	Germany	USA			Germany	USA		Germany	USA		Notes
Technological Attractiveness Index	Original Numbers	Difference	Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
Brand Names	30	194	164	billion GDP	0,0081	0,0111	20%	0,0016	0,0022	0,0006	
Technology	0,43866171	0,41442868	0,02423303	10	0,0439	0,0414	20%	0,0088	0,0083	0,0005	2013, OECD Drs
Distribution Networks	4,12	3,92	0,2	500	0,0082	0,0078	20%	0,00165	0,00157	0,00008	that the ratio was still
R&D: as a % of GDP	2,9191	2,79197	0,12713	-	0,0292	0,0279	10%	0,0029	0,0028	0,0001	Already as percent of GDP
R&D: rate of patenting	23197,9628	32116,0858	8918,123	GDP PPP hundred millions	0,0629	0,0184	10%	0,0063	0,0018	0,0044	adjusted for GDP in hundred millions PPP
Managerial Competencies	2,00	50,00	48	Country Population	0,00	0,02	20%	0,0005	0,0031	0,0026	adjusted per million of the population
Total Technological Attractiveness Index					0,1548	0,1223	100%	0,0217	0,0198	0,0019	100%
	Germany	USA			Germany	USA		Germany	USA		
Entry Attractiveness Index	Unadjusted/Original Number		Equalizer	Adjusted	Weight	Pre - Weighted	Difference				
Openness to Chinese Culture											
% of the population viewing China favorably	34%	38%	0,04	10	0,0340	0,0380	22%	0,0076	0,0084	0,0009	1 = most favorable: adjusted to
% of Overseas Ethnic Chinese	90.000	4.240.000	4.150.000	Country Population	0,0011	0,0132	22%	0,0002	0,0029	0,0027	2012, Overseas Community Affairs Statistics; equalize to not give the factor extra importance
Stock of Chinese born migrants	97.786	2.383.831	2.286.045	Country Population	0,0121	0,0742	22%	0,0027	0,0165	0,0138	In tens of millions
International Trade and Investment Environment											
Trade Issues											
Number of disputes against China	7	17	10	Per Chinese	-0,0189	-0,0355	7%	-0,0013	-0,0024	0,0011	Germany as part of the EU; in relation to amount of Chinese imports
Number of disputes against Germany/USA from China	4	9	5	Per Imports	-0,0108	-0,0188	7%	-0,0007	-0,0013	0,0005	Germany as part of the EU; in relation to US/EU imports
Number of anti-dumping cases against China	119	124	5	Per Chinese	-0,0321	-0,0259	7%	-0,0021	-0,0017	0,0004	Germany as part of the EU; in relation to amount of Chinese imports
Investment Openness											
OECD FDI Restrictiveness Index score	0,023	0,089	0,066	10	-0,0023	-0,0089	7%	-0,00015	-0,00059	0,0004	1 = closed; 0 = open
Bilateral investment treaty with China in force	1	0	1	100	0,01	0	7%	0,0007	0,0000	0,0007	1 = yes; 0 = no - in PDF
Total International Trade and Investment Environment Score:								-0,0036	-0,0059	0,0023	
Total Entry Attractiveness					-0,0069	0,0364	100%	0,0069	0,0219	0,0150	
	Germany	USA			Germany	USA					
	Pre - Weighted		Weight	Final Weighted Score	Difference						
Technological Attractiveness Index	0,0217	0,0198	0,0019167	66,67%	0,0145	0,0132	0,0012778				
Entry Attractiveness Index	0,0069	0,0219	0,01504133	33,33%	0,0023	0,0073	0,0050138				
Total Score	0,0286	0,0418		100%	0,0168	0,0205	0,00374				

## Appendix H: S ITIE

	Germany	USA			Germany	USA		Germany	USA		Notes
Technological Attractiveness Index	<i>Original Numbers</i>	<i>Difference</i>	<i>Equalizer</i>	<i>Adjusted</i>	<i>Weight</i>	<i>Pre - Weighted</i>	<i>Difference</i>				
Brand Names	30	194	164	billion GDP	0,0081	0,0111	20%	0,0016	0,0022	0,0006	
Technology	0,43866171	0,41442868	0,02423303	10	0,0439	0,0414	20%	0,0088	0,0083	0,0005	2013, OECD Drs
Distribution Networks	4,12	3,92	0,2	500	0,0082	0,0078	20%	0,00165	0,00157	0,00008	that the ratio was still
R&D: as a % of GDP	2,9191	2,79197	0,12713	-	0,0292	0,0279	10%	0,0029	0,0028	0,0001	Already as percent of GDP
R&D: rate of patenting	23197,9628	32116,0858	8918,123	GDP PPP hundred millions	0,0629	0,0184	10%	0,0063	0,0018	0,0044	adjusted for GDP in hundred millions PPP
Managerial Competencies	2,00	50,00	48	Country Population	0,00	0,02	20%	0,0005	0,0031	0,0026	adjusted per million of the population
Total Technological Attractiveness Index					0,1548	0,1223	100%	0,0217	0,0198	0,0019	100%
	Germany	USA			Germany	USA		Germany	USA		
Entry Attractiveness Index	<i>Unadjusted/Original Number</i>		<i>Equalizer</i>	<i>Adjusted</i>	<i>Weight</i>	<i>Pre - Weighted</i>	<i>Difference</i>				
Openness to Chinese Culture											
% of the population viewing China favorably	34%	38%	0,04	10	0,0340	0,0380	11%	0,0038	0,0042	0,0004	1 = most favorable: adjusted to
% of Overseas Ethnic Chinese	90.000	4.240.000	4.150.000	Country Population	0,0011	0,0132	11%	0,0001	0,0015	0,0013	2012, Overseas Community Affairs Statistics; equalize to not give the factor extra importance
Stock of Chinese born migrants	97.786	2.383.831	2.286.045	Country Population	0,0121	0,0742	11%	0,0013	0,0082	0,0069	In tens of millions
International Trade and Investment Environment											
Trade Issues											
Number of disputes against China	7	17	10	Per Chinese	-0,0189	-0,0355	13%	-0,0025	-0,0047	0,0022	Germany as part of the EU; in relation to amount of Chinese imports
Number of disputes against Germany/USA from China	4	9	5	Per Imports	-0,0108	-0,0188	13%	-0,0014	-0,0025	0,0011	Germany as part of the EU; in relation to US/EU imports
Number of anti-dumping cases against China	119	124	5	Per Chinese	-0,0321	-0,0259	13%	-0,0043	-0,0034	0,0008	Germany as part of the EU; in relation to amount of Chinese imports
Investment Openness											
OECD FDI Restrictiveness Index score	0,023	0,089	0,066	10	-0,0023	-0,0089	13%	-0,00031	-0,00119	0,0009	1 = closed; 0 = open
Bilateral investment treaty with China in force	1	0	1	100	0,01	0	13%	0,0013	0,0000	0,0013	1 = yes; 0 = no - in PDF
Total International Trade and Investment Environment Score:								-0,0072	-0,0119	0,0047	
Total Entry Attractiveness					-0,0069	0,0364	100%	-0,0020	0,0021	0,0040	
	Germany	USA			Germany	USA					
	<i>Pre - Weighted</i>		<i>Weight</i>	<i>Final Weighted Score</i>	<i>Difference</i>						
Technological Attractiveness Index	0,0217	0,0198	0,0019167	66,67%	0,0145	0,0132		0,0012778			
Entry Attractiveness Index	-0,0020	0,0021	0,00402807	33,33%	-0,0007	0,0007		0,0013427			
Total Score	0,0198	0,0219		100%	0,0138	0,0139		0,00006			

## Appendix I: S Entry

	Germany	USA			Germany	USA		Germany	USA		Notes
Technological Attractiveness Index	Original Numbers		Difference	Equalizer	Adjusted		Weight	Pre - Weighted		Difference	
Brand Names	30	194	164	billion GDP	0,0081	0,0111	20%	0,0016	0,0022	0,0006	
Technology	0,43866171	0,41442868	0,02423303	10	0,0439	0,0414	20%	0,0088	0,0083	0,0005	2013, OECD Drs
Distribution Networks	4,12	3,92	0,2	500	0,0082	0,0078	20%	0,00165	0,00157	0,00008	that the ratio was still
R&D: as a % of GDP	2,9191	2,79197	0,12713	-	0,0292	0,0279	10%	0,0029	0,0028	0,0001	Already as percent of GDP
R&D: rate of patenting	23197,9628	32116,0858	8918,123	GDP PPP hundred millions	0,0629	0,0184	10%	0,0063	0,0018	0,0044	adjusted for GDP in hundred millions PPP
Managerial Competencies	2,00	50,00	48	Country Population	0,00	0,02	20%	0,0005	0,0031	0,0026	adjusted per million of the population
Total Technological Attractiveness Index					0,1548	0,1223	100%	0,0217	0,0198	0,0019	100%
	Germany	USA			Germany	USA		Germany	USA		
Entry Attractiveness Index	Unadjusted/Original Number			Equalizer	Adjusted		Weight	Pre - Weighted		Difference	
Openness to Chinese Culture											
% of the population viewing China favorably	34%	38%	0,04	10	0,0340	0,0380	13%	0,0043	0,0048	0,0005	1 = most favorable: adjusted to
% of Overseas Ethnic Chinese	90.000	4.240.000	4.150.000	Country Population	0,0011	0,0132	13%	0,0001	0,0016	0,0015	2012, Overseas Community Affairs Statistics; equalize to not give the factor extra importance
Stock of Chinese born migrants	97.786	2.383.831	2.286.045	Country Population	0,0121	0,0742	13%	0,0015	0,0093	0,0078	In tens of millions
International Trade and Investment Environment											
Trade Issues											
Number of disputes against China	7	17	10	Per Chinese	-0,0189	-0,0355	13%	-0,0024	-0,0044	0,0021	Germany as part of the EU; in relation to amount of Chinese imports
Number of disputes against Germany/USA from China	4	9	5	Per Imports	-0,0108	-0,0188	13%	-0,0013	-0,0023	0,0010	Germany as part of the EU; in relation to US/EU imports
Number of anti-dumping cases against China	119	124	5	Per Chinese	-0,0321	-0,0259	13%	-0,0040	-0,0032	0,0008	Germany as part of the EU; in relation to amount of Chinese imports
Investment Openness											
OECD FDI Restrictiveness Index score	0,023	0,089	0,066	10	-0,0023	-0,0089	13%	-0,00029	-0,00111	0,0008	1 = closed; 0 = open
Bilateral investment treaty with China in force	1	0	1	100	0,01	0	13%	0,0013	0,0000	0,0013	1 = yes; 0 = no - in PDF
Total International Trade and Investment Environment Score:								-0,0068	-0,0111	0,0044	
Total Entry Attractiveness					-0,0069	0,0364	100%	-0,0009	0,0045	0,0054	
	Germany	USA			Germany	USA					
	Pre - Weighted			Weight	Final Weighted Score		Difference				
Technological Attractiveness Index	0,0217	0,0198	0,0019167	33,33%	0,0072	0,0066	0,0006389				
Entry Attractiveness Index	-0,0009	0,0045	0,00540473	66,67%	-0,0006	0,0030	0,0036032				
Total Score	0,0209	0,0244		100%	0,0067	0,0096	0,00296				

No.	Author/Title	
221.	Greenup, Katherine / Löchel, Horst The Relative Attractiveness of Germany and the United States for Chinese Overseas Investments	2016
220.	Löchel, Horst / Packham, Nathalie / Hölzl, Eugen The Funding of Small and Medium Companies by Shadow-Banks in China	2016
219.	Kempa, Karol / Moslener, Ulf Climate Policy with the Chequebook – Economic Considerations on Climate Investment Support	2015
218.	Deaves, Richard / Lei, Jin / Schröder, Michael Forecaster overconfidence and market survey performance	2015
217.	Nitsche, Christin / Schröder, Michael Are SRI funds conventional funds in disguise or do they live up to their name?	2015
216.	Wang, Li / Menkhoff, Lukas / Schröder, Michael / Xu, Xian Politicians' Promotion Incentives and Bank Risk Exposure in China	2015
215.	Lang, Michael / Schröder, Michael What drives the demand of monetary financial institutions for domestic government bonds?	2015
214.	Vandenbussche, Jérôme / Vogel, Ursula / Detragiache, Enrica Online Appendix to: Macprudential Policies and Housing Prices – A New Database and Empirical Evidence for Central, Eastern and Southeastern Europe	2014
213.	Bonczek, Thomas / Fuest, Clemens / Schröder, Michael Who is afraid of the Asset Quality Review? Potential Losses and Capital Shortfalls in the European Banking System	2014
212.	Noack, Tim / Cremers, Heinz / Mala, Julia Neue regulatorische Konzepte der Bankenaufsicht und ihre Auswirkungen auf die Gesamtbanksteuerung	2014
211.	Natalie Packham/ Michael Kalkbrener/ Ludger Overbeck Default probabilities and default correlations under stress	2014
210.	Buschmann, Christian / Heidorn, Thomas The Liquidity Reserve Funding and Management Strategies	2014
209.	Heidorn, Thomas / Mokinski, Frieder / Rühl, Christoph / Schmaltz, Christian The Impact of Fundamental and Financial Traders on the Term Structure of Oil	2014
208.	Krasnosselski, Nikolai / Cremers, Heinz / Sanddorf-Köhle, Walter Messung des Marktrisikos mit generalisierter autoregressiver bedingter heteroskedastischer Modellierung der Volatilität	2014
207.	Winkler, Adalbert The Lender of Last Resort in Court	2014
206.	Winkler, Adalbert Der lender of last resort vor Gericht	2013
205.	Lang, Michael The Early Warnings of Balance-of-Payments problems: Kaminsky and Reinhart Revisited	2013
204.	Odermann, Alexander / Cremers, Heinz Komponenten und Determinanten des Credit Spreads – Empirische Untersuchung während Phasen von Marktstress	2013
203.	Vogel, Heinz-Dieter / Bannier, Christina E. / Heidorn, Thomas Functions and characteristics of corporate and sovereign CDS	2013
202.	Loechel, Horst / Packham, Natalie / Walisch, Fabian Determinants of the onshore and offshore Chinese Government yield curves	2013

Printed edition: € 25.00 + € 2.50 shipping

Download working paper:

<http://www.frankfurt-school.de/content/de/research/workingpapers.html>

**Order address / contact**

Frankfurt School of Finance & Management

Sonnemannstr. 9–11 ■ 60314 Frankfurt/M. ■ Germany

Phone: +49 (0) 69 154 008–770 ■ Fax: +49 (0) 69 154 008–4770

eMail: [l.mentz@fs.de](mailto:l.mentz@fs.de)

Further information about Frankfurt School of Finance & Management  
may be obtained at: <http://www.fs.de>