Hochschule für Angewandte Wissenschaften Hamburg
Hamburg University of Applied Sciences

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Name:
Sven Faust [redacted]

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"Chinese OFDI in German companies: an analysis of host country externalities and development of a success-predicting model based on host country company absorptive capacity"

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1st examiner:
Prof. Dr. Natalia Ribberink

2nd examiner:
Prof. Dr. Michael Gille

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Abstract

After decades of corporations from developed countries investing in developing economies, the contemporary business environment sees more and more enterprises from emerging markets that use FDI in developed countries themselves. Chinese investors in particular acquire unprecedented numbers of companies in Europe and especially Germany. This thesis examines the motives of such acquisitions and finds that these emerging country investors are driven by different incentives than their developed country counterparts. The same is true for the companies which are at the receiving end of FDI transactions so that e.g. German companies seek foreign capital for very different reasons than Chinese ones. At the centre of the analysis lies a predictive model which has the purpose of forecasting the probable outcome of a new Sino-German FDI transaction based on the experiences made with past cases. The dataset collected for this purpose reveals that small German companies of the metals industry located in the East of Germany have the highest risk of performing poorly under a Chinese investor. Companies of the automotive industry located in the North on the other hand have positive prospects in case they come under Chinese ownership. For the success-predicting model itself the statistical tool of linear discriminant analysis is chosen and applied in such a way that it can measure the economic success of a transaction based on both the acquired company's general features and ability to absorb externally provided assets. In order to make this statistical analysis an easily accessible tool for any user, a dashboard-style application is created. It has an interface that allows easy input of the data required for the analysis and presents its results in a fashion that makes it directly usable in a potential FDI decision.

Keywords: Chinese investors, outward foreign direct investment, absorptive capacity, host country externalities, success prediction model

JEL classification: C38, C51, C53, F21, F23

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V. List of abbreviations

AC	Absorptive capacity
BMD4	Benchmark Definition of Foreign Direct Investment 4th Edition
BOP	Balance of payments
BRIC	Brazil, Russia, India, China
CHKD	Chinese Chamber of Commerce in Germany
DPMA	Deutsches Patent- und Markenamt (German patent office)
EC	European Communities
F/A	Fixed assets
FDI	Foreign direct investment
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GSP	Generalized System of Preferences
GTAI	Germany Trade and Investment
HCE	Host country externalities
IFDI	Inward foreign direct investment
JV	Joint venture
LDA	Linear discriminant analysis
LR	Logistic regression
M&A	Merger and acquisition

MOFCOM	Ministry of Commerce (of China)
NDRC	National Development and Reform Commission
NTB	Non-tariff barrier to trade
OECD	Organisation for Economic Cooperation and Development
OFDI	Outward foreign direct investment
OLI (paradigm)	Ownership, localisation and internalisation (paradigm)
R&D	Research and development
SEM	Single European Market
SME	Small- or medium-sized enterprise
SOE	State-owned enterprise
TB	Tariff barrier to trade
TBT	Technical barrier to trade
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UR	Unternehmensregister (German business register)
VIF	Variance inflation factor
WTO	World Trade Organization

1 Introduction

1.1 Research problem

Since the turn of the millennium foreign direct investment (FDI) has rapidly transitioned from being an exclusive tool for corporations from developed countries to globally expand their businesses in the search for efficiency gains to a truly global phenomenon used by emerging market enterprises to compete and even exceed the established global players. While FDI activity among emerging countries has become a common occurrence by now, purchases by emerging country enterprises in developed markets such as Europe or the US are still often negatively connoted due to their relative rarity. Headlines such as “That’s how dangerous the Chinese shopping frenzy is for German companies”, “How China strips bare the German business landscape”, or “German know-how in danger” verbalise the fears of many German politicians and employees (Zschäpitz, 2017; Stocker, 2017; Stoppel, 2017). It is a fact that German production know-how and techniques for a long time have been admired by China to stand for persistent quality and security (Bialek et al., 2011). Thus, the spreading fear in Germany is that Chinese foreign direct investors have no lasting interest in German companies but are only after their know-how.

Accordingly, numerous authors have conducted research on this issue covering topics like the lack of equality in reciprocal FDI treatment (Jungbluth, 2016), effects on employment numbers in German companies (Pfoertsch & Liu, 2011), as well as cultural differences (Bian, 2012) just to name a few. In general, Chinese investors’ acquisitions bring forward much better results than their reputation suggests with long-term expansion strategies being the standard rather than the exception (Emons, 2015, p. 10). That being said, there are also negative examples of Sino-German business transactions in which the acquired German companies eventually faced insolvency (Veitinger, 2012). These inconsistent reports complicate the complex decision-making process of FDIs even further and leave German businesses in need of an investor uncertain of whether Chinese capital is a suitable option for them. One means of supporting the decision-making process is presented by host country externalities which help to quantify the effects of FDI from the perspective of the country at which it is aimed. Host country externalities constitute advantages and/or disadvantages at the company-level which can be measured at the country-level. More recently, the concept of so-called absorptive capacity has gained ever increasing attention throughout the literature. By examining the efficiency with which

companies acquired by foreign direct investors absorb the assets provided absorptive capacity can help to determine the success prospects of FDI transactions. However, both concepts have not been applied in predictive research of FDI transactions in which Chinese corporations acquire German ones. Consequently, this thesis' first aim is to examine which company features lead to which outcome in terms of success of an FDI acquisition and secondly, to develop an instrument to predict the outcome of future cases of such Germany-targeted FDI flows based on a host country perspective.

This leads to the formulation of two research questions the first of which is which characteristics of a German company purchased by a Chinese foreign direct investor tend to have a negative/positive impact on its business success.

The second research question to be answered is whether a significant statistical success-predicting model can be developed which is able to make a profound recommendation with regard to a potential acquisition of a German company by a Chinese corporation based on the concepts of host country externalities and absorptive capacity.

1.2 Research method and course of investigation

In order to answer the research questions, this thesis will firstly carry out an in-depth literature research which helps to identify the shortcomings of existing research work and thereby determine the starting point from which a model can be developed. Subsequently, the second task of this thesis will be the development of a statistical model based upon a newly created quantitative dataset.

Chapter 2 in general will examine the topic of FDI from the perspective of the country where it originates from. The analysis will begin with a review of the motives that incentivise foreign direct investors from developed countries to expand their business activities beyond the borders of their home markets. Furthermore, differences in the goals of foreign direct investors from developing countries to the aims of ones from developed countries will be assessed. This will be followed by a discussion of the issues of market entry modes as well as barriers due to their high significance for FDI transactions. A brief history of FDI will provide an understanding of the developments and changes based on the previous insights. Subsequently, the particularities of German foreign direct investors in China and Chinese ones in Germany will be compared and their similarities as well as differences exposed.

The point of view will be switched in chapter 3 which will examine the motivations behind receiving FDI both at the macro- as well as microeconomic levels. The impacts FDI can have on various aspects of the country at which the capital is directed will be discussed. The analysis will explain how benefits for the company that is invested in can translate into benefits for the entire country's economy. This will be the first step to make the success of FDI transactions quantifiable for the following statistical purposes. Furthermore, a quantitative investigation with the aim of identifying the most frequently occurring impacts on the economy, in which the acquired company is located, will be conducted. This analysis based on real-world Sino-German FDI cases will provide insights into the economic effects Chinese investors have on Germany and from which actions in their German affiliates these effects originate. It will then be analysed how the ability of a company to absorb a potential investor's provided resources and translate them into business success can be measured. For that the existing literature on the issue of quantifying such abilities will be reviewed, and then the literature's shortcomings regarding the case of developing countries' FDIs directed at developed economies will be examined. Research will be conducted on how the resources that such an FDI investor provides differ from those of an investor from a developed country. The ability to incorporate provided assets will be later used to analyse which characteristics lead to a German company's business success after being acquired via FDI from China.

The general design of the statistical model developed in order to answer the initially posed research questions will be introduced at the beginning of chapter 4. The first step will be to determine which model is best-suited for the aims of this thesis and the second step to create a framework into which the chosen model can be placed, and the design of which leads to the desired research answers. An important constituting feature of the analysis will be the fact that the experiences made with past Sino-German FDI transactions will be used as the basis for the prediction of a potential new case. This entails the need for a set of past transactions which results in the creation of an appropriate dataset. The development of the individual components of the proposed model will be defined in such a way that a number of characteristics of the existing cases from the dataset can be connected to the success of each individual case. This way the foundation for a later prediction of a new case, of which the same number of characteristics is known, will be laid. The model creation will entail numerous descriptive analyses as well as normalisation procedures in order to

align all of its components. The analysis of the dataset of past Sino-German FDI cases will be carried out as a next step. In order to being able to evaluate the final results, the model will be optimised according to statistical theory so that its prediction power for the later analysis of a new case will be as accurate as possible. With respect to the first research question, insights into which company characteristics lead to a negative or a positive outcome of Chinese FDI in German companies will be provided at this point. The analysis will then move on to the model's prediction part and its prediction accuracy will be tested by re-predicting the outcome of three existing cases from the dataset, of which the results are already known. Moreover, a dashboard-style tool which contains the entire developed statistical model, but presents it in a user-friendly manner that simplifies its application, will be presented. Eventually, a new case of a real-world Sino-German FDI transaction will be predicted and its results discussed.

As a last step, chapter 5 will provide a summary of the findings of this thesis, critically acclaim it, and attempt a future outlook with respect to the issue of Chinese investors acquiring German companies.

2 The home country perspective: OFDI

2.1 Mainstream theories of OFDI

2.1.1 Incentives of conducting OFDI

In order to outline its key aspects and develop a definition of FDI that suits this thesis' purposes turning towards the Organisation for Economic Cooperation and Development's (OECD) standard work "Benchmark Definition of Foreign Direct Investment 4th Edition" (BMD4) seems appropriate. It highlights the "foreign" characteristic of FDI by defining it as an investment that crosses a national border, is conducted by the "direct investor" who is resident of one country and is received by the "direct investment enterprise" which is resident of another country than the former (OECD, 2008, p. 17). The latter is also frequently referred to by the term "target company" (Danbolt, 2004, p. 2) which will be used in this thesis from here onwards. The involvement of two directly interacting parties located in two different countries can be deduced from the BMD4 definition and while the country in which the FDI originates is called "home country", the country at which the FDI is aimed, and is foreign from the investor's point-of-view, is called "host country" (Moosa, 2002, p. 275). In the early days of its establishment the United Nations Conference on Trade and Development (UNCTAD) used to label these kinds of transactions "foreign private

investment" which nowadays is an outdated term (UNCTAD, 1964, p. 49). However, its mentioning helps to reemphasise the fundamental nature of FDI: a flow of capital from one private company to another private company.

A generally acknowledged prerequisite for a cross-border investment to qualify as FDI is an acquisition of a minimum of ten percent of the host company's voting rights i.e. shares as will be further elaborated on later (IMF, 2004, p. 6). This threshold is substantiated by the OECD with the failure of the direct investor to display "the objective of establishing a lasting interest" in the target company in direct investment cases acquiring less than ten percent of the voting rights (OECD, 2008, p. 17). In the process of an FDI, foreign capital is used to build "domestic structures, equipment, and organizations", but not to directly increase the target company's equity (USLegal, 2016). This reemphasises the direct investor's associated wish for a lasting interest and influence or, as the UNCTAD puts it in their 1999 World Investment Report, for "exercising control and having a voice in the management" in the target company (UNCTAD, 1999, p. 3). This aspect of FDI differentiates it from other forms of investment such as portfolio investment which has a short-term orientation (Moosa, 2002, p. 1). As proposed by the International Monetary Fund (IMF), depending on their direction of flow and always from the reporting economy's point of view (IMF, 2007, pp. 8-9), total bilateral FDIs between two entities can be divided into inward foreign direct investment (IFDI) and outward foreign direct investment (OFDI)[1] that represents a useful delineation for statistical purposes as for example depicted by Eurostat's online available FDI statistics (Eurostat, 2016). Data on FDI can generally be organised threefold: firstly financial flows, which for a specific time span measure all FDI investments between two involved parties; secondly FDI income, which specifies the direct investor's return on FDI; and thirdly FDI stock, which equals a direct investor's total value of FDI at a specific date of measurement (OECD, 2015, p. 5).

From the home country's (or direct investor's) point of view, OFDI can be categorised into horizontal, vertical and conglomerate OFDI, whereby horizontal OFDI is an instrument to better capitalise on existing monopolistic or oligopolistic competitive

[1] In this thesis, the demarcation with the help of the prefixes "O" (outward) and "I" (inward) will always be used to describe FDI the flow direction of which is known (i.e. country of origin and country of destination), even if the flow direction may be deduced from the context of a sentence. The term "FDI" on the other hand will be used to refer to a general bilateral view of cross-border capital flows with no specific flow direction.

advantages that the investing company has in the form of patents or a highly developed level of differentiation of its product from competitors' products of the same kind (Caves, 1971, pp. 10-11). In the course of such OFDI the direct investor takes over competing companies. Correspondingly, vertical OFDI is a movement along the direct investor's supply chain either backward (taking over suppliers of raw materials etc. in order to improve cost efficiency) or forward (taking over distributors etc. in order to achieve a closer customer relationship), so that activities different from the company's original core product are undertaken. The third form is conglomerate OFDI which is a mixture of both horizontal and vertical OFDI strategies (ibid.).

Another categorisation from the source country's point of view is suggested by Chen and Ku depending on the underlying strategy of the investment so that on the one hand they identified "expansionary" OFDI, which is characterised by the direct investor's intention to better capitalise on an existing advantage and is based on the theory of intrinsic advantages that will be examined later in this chapter, and on the other hand "defensive" OFDI, which is driven by the direct investor's aim of cost reductions (Chen & Ku, 2000, p. 154).

Moreover, according to Dunning and Lundan, a direct investor's motives can be categorised into the following four strategies:

(i) natural resource-seeking,
(ii) market-seeking,
(iii) efficiency-seeking, and
(iv) strategic asset or capability-seeking (Dunning & Lundan, 2008, pp. 67-68).

(i) Natural resource-seeking direct investors' motives for OFDI are threefold. Firstly, they can have the wish to improve the investing company's profitability by gaining access to specific resources at a lower price and/or of improved quality from host countries that are naturally endowed with raw materials such as oil, coal, gas or agricultural products (Dunning & Lundan, 2008, p. 68; Voss, 2011, p. 17). Secondly, the sought-after resource can also be the broad access to unskilled labour required to reduce production costs (Franco et al., 2008, p. 7).

(ii) Market-seeking OFDI is utilised to better distribute the direct investor's company's products to markets outside its home country when cost-increasing tariffs or other barriers arise or when it becomes profitable to substitute exports by local manufacturing due to an increase in the foreign market's size (Dunning & Lundan,

2008, pp. 69-70). Other reasons include improved closeness to the market and the associated better understanding of local customer needs and preferences, as well as the setup of a physical establishment in order to impede market access for competitors (Franco et al., 2008, p. 7). Also the high shipping costs of bulk goods can foster market-seeking OFDI since it may be more economical to produce them in small quantities in the target market than to ship them there (Dunning & Lundan, 2008, p. 70). Jungnickel and Keller note that both resource- and market-seeking OFDI can transfer knowhow to and increase the productivity of foreign subsidiaries, however, they typically do not support their specialisation process since the aim is to sell existing products in new markets (Jungnickel & Keller, 2003, p. 1). Furthermore, market-seeking OFDI is always a horizontal form of FDI since production steps are simply replicated and no steps upstream or downstream the supply chain are being established in the host country (Kinoshita & Campos, 2003, p. 3).

(iii) Efficiency-seeking OFDI aims at improving and harmonising the common governance of subsidiaries that are disperse in terms of their locations as well as rationalising their respective activities (Dunning & Lundan, 2008, p. 72). This implies the capitalisation on economies of scale effects which improve the overall efficiency of multinational enterprises (MNEs) that have subsidiaries in different parts of the world (Jungnickel & Keller, 2003, p. 1). Efficiency improvements can affect costs of labour, general production, administration and communication, but also cost reductions in terms of research and development (R&D) and better technology implementation (Voss, 2011, p. 17). It can be seen that this type of OFDI is closely related to the two abovementioned ones, since an efficiency increase through cost reduction can also be achieved via optimised access to resources or capitalisation of new market opportunities. Dunning and Lundan identify that efficiency-seeking OFDI motives are the reason for large MNEs to locate “capital-, technology- and information-intensive activities” in developed countries, and “labour- and natural resource-intensive activities” in developing countries (Dunning & Lundan, 2008, p. 72). This observation substantiates the blurred boundaries between the different types of OFDI motives.

(iv) Strategic asset-seeking OFDI, as introduced by Dunning, has the aim of creating or gaining “access to resources and capabilities that complement” the existing core competence of the investing MNE (Dunning, 1991, p. 135). However, it is often omitted by the literature due to the above three OFDI types being able to describe all

FDI projects already, thus rendering it redundant. For example Rugman & Nguyen criticise that the concept of strategic asset-seeking OFDI is incompatible with the OLI paradigm (which will be explained in the following chapter) due to the fact that they do not build upon exploiting an MNE's existing advantage, but upon acquiring such an advantage from foreign target companies (Rugman & Nguyen, 2014, p. 54). However, as Meyer points out, it is exactly this category that OFDI from emerging countries is included in, thus making it an important concept in order to understand their underlying motivations (Meyer, 2015, p. 60). In line with this contemporary argumentation, the primary goal of such OFDI is to push forward the MNE's long-term strategic objectives and improve their competitiveness on a global scale by means of acquisition of foreign target companies (Dunning & Lundan, 2008, p. 72). The strategic aspect is incorporated by this OFDI's added notion of a strategic competitive advantage that the direct investor obtains by acquiring new technologies or internationally known brand names. These strategic assets provide the investing MNE not only with a competitive advantage on the local host country market, but in addition on its home market (Meyer, 2015, p. 60). Other examples of strategic assets that OFDI investors can seek after include, among others, "technological capability, management or marketing expertise and organisational skills" (Dunning & Lundan, 2008, p. 69) which are assets that are hard to replicate through other instruments than an acquisition (Voss, 2011, p. 18), an entry mode that will be discussed in detail in chapter 2.3. Regularly, companies that conduct this type of OFDI are MNEs without existing specific advantages (Motta, 1996; Fosfuri & Motta, 1999). Motta has found that MNEs do not necessarily need to have any firm-specific advantage over local companies in the host country in order to successfully conduct OFDI (Motta, 1996, p. 17). Thus, this thesis not only acknowledges the necessity of the OFDI category "strategic asset-seeking", but even considers it inevitable for studying OFDI endeavours of MNEs from developing countries which do not possess firm-specific advantages themselves and acquire target companies in developed economies nonetheless.

When discussing the four OFDI types introduced above, emphasis should be put on the fact that MNEs nowadays almost exclusively conduct OFDI that pursues a multitude of objectives so that their investments combine at least two, and often even more of them (Dunning & Lundan, 2008, p. 68).

2.1.2 The interconnectedness of OFDI and multinational enterprises

As has become apparent in the previous chapter, numerous authors have studied the functioning and the reasons for OFDI from as early as the 1950s and correspondingly have examined it from many different perspectives. However, an important and inevitable aspect of OFDI is its strong interconnectedness with MNEs, which is rooted in the fact that a large portion of all international trade is conducted by these global players (Lorz & Siebert, 2014, p. 143). Other authors even attribute OFDI a link to MNEs so strong that they suggest it can be used to demarcate MNEs from other companies (Moosa, 2002, p. 7). It is therefore important to understand the extent of international influence that these corporations can achieve. Large and globally active companies of this kind are referred to by differing terminology in the literature so that it seems appropriate to develop a definition suitable for the purposes of this thesis. Beginning with the second part of the name MNE, the United Nations (UN) state that the terms “corporation”, “firm” and “company” can be used in an interchangeable manner, but that the term “enterprise” has a different notion by describing the entity of “a network of corporate and non-corporate entities in different countries joined together by ties of ownership” (UN, 1973, p. 4). It further states that “an affiliate is an enterprise under effective control by a parent company” (ibid., pp. 4-5). Since this thesis is focused on OFDI activity (which involves a lasting interest and control in management as mentioned above), the term multinational “enterprise” will be used from here onwards in favour of the terms multinational “corporation”, “firm” or “company”. The literature describes enterprises that operate further than its country’s borders with terms such as “multinational”, “international”, “transnational” or “global”. Bartlett and Ghoshal state that an international activity is defined by a company that operates in a centralised manner where all knowledge is created at the central headquarters and not changed for overseas operations (Bartlett & Ghoshal, 1998, p. 75). Typically, these international companies perform import and export trade in the sense that they manufacture their products on the domestic market and sell them abroad (Moosa, 2002, p. 6). This makes them vulnerable to possible tariff barriers (TB) and non-tariff barriers (NTB) to trade as will be explained later. Global companies are also defined as centralised organisations whose overseas operations are encouraged to implement and locally adapt the strategies developed in the headquarters (Bartlett & Ghoshal, 1998, p. 75). The international company is thus characterised by an effort to better understand customer needs in foreign markets by

customising the headquarters' overall strategy to the foreign market's local context (Morgan, 2001, p. 7). Multinational enterprises have adopted a decentralised approach so that all overseas activities are self-sufficient in their respective domestic markets enabling the generation of knowledge there (Bartlett & Ghoshal, 1998, p. 75). Usually these operations involve the establishment of equity-based market entry modes such as subsidiaries, affiliates or joint ventures (JV) (Moosa, 2002, p. 6), which will be explained later. These decentralised entities have developed a high sense of customer needs in their local markets, however, they are only weakly linked to each other (Morgan, 2001, p. 7). In transnational enterprises the overseas entities become dispersed and specialised but also work together to benefit the prioritised integrated worldwide operations (Bartlett & Ghoshal, 1998, p. 75) that have the side-effect of increasing difficulty to unambiguously demarcate the home country of the enterprise among the numerous markets it operates in (Moosa, 2002, p. 7). An international company can be considered to become a multinational one when it conducts OFDI. Henceforward, MNEs will thus describe a large enterprise that utilises OFDI and has overseas entities located in numerous regions around the globe that implement an adapted version of the headquarters' corporate strategy. The headquarters can still be clearly identified as such and have the notion of being the enterprise's "maternal institution" (ibid.).

As can be deduced from the definition of MNEs established above, a constituting feature of them is their ownership of one or more foreign affiliates that have been acquired in the course of an OFDI. The UNCTAD determines three different kinds of foreign affiliates located in the host country: firstly subsidiaries, which are incorporated companies in which the direct investor owns more than fifty percent of the voting rights "and has the right to appoint or remove a majority of the members of the administrative, management or supervisory body"; secondly associates, which are incorporated companies "in which an investor owns a total of at least ten percent, but no more than a half, of the shareholders' voting power"; and thirdly a branch, which is "a wholly or jointly owned unincorporated enterprise" and can take the form of a permanent establishment, a partnership that is unincorporated or a JV "between the foreign direct investor and one or more third parties (UNCTAD, 1999, p. 465).[2]

[2] According to the UNCTAD also land, structures, immovable as well as movable equipment qualify as a branch in the sense of foreign affiliates in OFDI transactions.

When it comes to the reasons of initiating OFDI, Hymer's dissertational work discovered what makes MNEs strive towards ownership of a company in a foreign country and is considered as the foundation of direct investment theory throughout the literature[3]. In his early review of OFDI, Hymer finds that a major reason for international expansion is the existence of an MNE's advantage of some kind so that it wants to best exploit this advantage through increased profitability from foreign operation (Hymer, 1977, p. 33). This can be recognised as the theoretical fundament of what is known as the process of "outsourcing" today. From an MNE's strategic point of view it is found that OFDI is also used as an instrument to control and diminish competition between companies from different countries (ibid.). This observation displays a strong relationship with what nowadays can be described as a "hostile takeover" from foreign investors. According to Caves, an MNE, and in fact any other enterprise, comes with its own identity that it is naturally endowed with through the country of its incorporation, which automatically equips it with "a large stock of knowledge about the language, laws, and customs of its native land" that can be considered intangible assets (Caves, 1974, p. 17). The inverse conclusion of the latter finding is that these MNEs must have some other advantages which enable them to successfully compete with companies native to the foreign market, since these are endowed with the same kind of identity-induced knowledge for that market (Blomström et al., 2000, p. 2). These required other advantages also come in the form of intangible assets such as patents, trademarks or specialist knowhow on production and distribution of products and, in order to make OFDI a profitable option for the company, must outweigh the abovementioned disadvantages it has through lack of country-specific knowledge (Caves, International trade, international investment, and imperfect markets, 1974, p. 18). OFDIs based on advantages of this kind are especially common in oligopolistic industries in which they constitute a strong market entry barrier (Moon & Roehl, 2001, p. 199).

McManus lay the groundwork for the concept of the so-called "internalisation theory" by exploring the role of transaction costs that emerge and result in the need of coordination between the direct investor and the foreign entities (McManus, 1972). Especially if the commodity traded among them is knowledge, expertise, skills etc. the need for a regulating MNE that makes this exchange more efficient arises to

[3] See i.a. Moosa, 2002, p. 1; Blomström et al., 2000, p. 2; Juritsch, 2011, p. 63

prevent a possible threat of market failures (Blomström et al., 2000, pp. 2-3). While Hymer's abovementioned views reflect those of an MNE that pursues a monopoly-driven rent maximisation strategy, Buckley and Casson in their work put forward the concept of internalising formerly extrinsic imperfect activities in the market into their own enterprise's borders in order to capitalise on eliminated transaction costs for knowledge, information, and negotiations (Buckley & Casson, 1976). Markets out of a company's boundaries tend to be imperfect because of "firm-specific intangible assets" that each individual enterprise only holds itself and does not share with other market participants (Blomström et al., 2000, p. 3).

Establishing and bringing together the factors of ownership (firm-specific intrinsic knowledge that creates a competitive advantage), localisation (naturally endowed knowledge about local market) and internalisation (bypassing market imperfections), Dunning in his eclectic OLI paradigm proposes that a proper model to explain OFDI must comprise a number of different approaches (Dunning, 1981). It is a concept that uses these three sets of advantages to analyse the "determinants of international production", the outcome of which varies to a vast extent depending on the context that they are analysed in (Dunning, 2001, p. 176). The three factors represent necessary preconditions for an MNE to decide for OFDI over other market entry modes, such as exporting or licensing in which case only the two prerequisites of ownership and localisation advantages are given but cannot be internalised (Voss, 2011, p. 15). When it comes to explaining MNEs' international business activities, Dunning's OLI model has become the most acknowledged theory and is therefore also referred to as the "eclectic paradigm" or "OLI paradigm".

Among these traditional OFDI theories, Kogut notes that the abovementioned widely accepted literature on OFDI and MNEs respectively tends to overemphasise the initial decision of an MNE to invest abroad (Kogut, 1983, p. 42). Instead, again stressing the long-term commitment of the direct investor, Kogut points out that an OFDI investment is not the singular decision to conduct it, but rather an incremental series of decisions about "the volume and direction of these transferred resources". This way, OFDI represents a continuing, highly flexible operational process and not, as sometimes stated in the literature, a mere location decision and transactional cost-minimising realisation (ibid.). OFDI cannot be adequately analysed with a tool that regards it with a static approach because the business environment it is placed in is one that is subject to constant dynamic change and evolvement (Voss, 2011, p. 16).

This is an important amendment to the mainstream OFDI literature in order to understand that OFDI is a strategic long-term investment process.

Limitations to these models (esp. the OLI paradigm as the most disseminate one) have further been criticised by more recent and so-called “unconventional OFDI” or “emerging OFDI” theories due to the fact that they can only account for OFDI from developed countries and none from developing countries (Moon & Roehl, 2001, p. 199; Huang & Zhu, 2016, p. 15). The reason for this is these models’ inherent focus on resource-based advantages that fails to explain any OFDI made for other reasons than better capitalisation on advantages (Moon & Roehl, 2001, p. 198). These reasons include OFDI targeted at diminishing competitors’ market shares as well as OFDI that strives to improve a company’s own “arsenal of resources” in anticipation of potential competition in the future (ibid.). Since the countries of developing Asia have been recognised by the UNCTAD as the “new FDI powerhouses” in 2011 the need for more contemporary models explaining these FDI flows becomes apparent (UNCTAD, 2011, p. xii).

2.2 Emerging theories of OFDI motivation

A number of typical reasons why MNEs from developed countries choose to invest in target companies in foreign countries have been discussed in the previous chapter ranging from the mere exploitation of an existing competitive advantage on international markets to the internalisation theory to the OLI paradigm. This section will analyse the underlying motives of OFDI from developing countries or emerging economies.

MNEs from developing countries differ fundamentally in their prerequisites for OFDI activity. Firstly, the majority of them lack ownership advantages that were developed throughout a long company history like technological advancement, management skills or high reach global brands (Huang & Zhu, 2016, p. 15). Secondly, they often act in a very political setting in terms of governmental incentives that actively support local enterprises to expand globally (Luo et al., 2009, p. 1). Thirdly, labelled “springboarding” by Luo and Tung, they utilise a different internationalisation approach which has the aim of compensating for their lack of competitive advantages by acquiring foreign companies that possess “sophisticated technology or advanced manufacturing know-how” (Luo & Tung, 2007, p. 485). Fourthly, they have comparatively little experience in international operations and capitalise on their

“latecomer” position through accelerated internationalisation by utilising processes such as “linkage, leverage and learning” which do not imply a quest for monopolistic advantages but rather a tapping of resources in places other than their home market (Gammeltoft et al., 2010, pp. 1, 3; Huang & Zhu, 2016, p. 16). Finally, they almost exclusively choose an OFDI strategy that is comparable to the strategic asset-seeking method introduced in chapter 2.1.1 whereby they acquire established corporations in developed countries with the aim of closing the gap to the Western global players (Deng, 2009, p. 74).

Due to these divergences from developed countries’ OFDI activities researchers in this field have devised new theories that seek to better explain the characteristics of developing country OFDI[4]. Furthermore, Moghaddam et al. found that the typology suggested by Dunning and Lundan only achieves very low precision when it comes to categorising the internationalisation strategies of developing countries’ MNEs and therefore propose a more adequate revised version of it (Moghaddam et al., p. 365). According to them, the original model should be adapted to comprise of the following six categories:

(i) end-customer market-seeking,
(ii) natural resource-seeking,
(iii) knowledge-seeking,
(iv) efficiency-seeking,
(v) global value consolidation-seeking, and
(vi) geopolitical influence-seeking.

(i) End-consumer market-seeking OFDI has the primary goal of purchasing a target company that has already been a customer of the investing MNE whereby the latter seeks to ensure guaranteed orders by this company. This way, the direct investor can be considered to conduct forward integration down the value chain. This aspect of market-seeking OFDI must be delineated from its classic goal of reaching potential new customers, although it is still an important part of this newly proposed strategy. Due to its nature as a “revenue-ensuring tool” end-consumer market-seeking OFDI has a high value creation potential for the direct investor (Moghaddam et al., p. 366).

[4] These include i.a. the imbalance theory (Moon & Roehl, 1993), the “Link, Leverage, Learning” framework (Mathews, 2006) and the governmental or institution perspective (Buckley et al., 2008).

(ii) Natural resource-seeking OFDI has the sole purpose of ensuring the supply of an MNE with natural resources from a supplying target company. The acquiring MNE in this category purchases a company that is upstream the value chain thus conducting backward integration (ibid.). What distinguishes this new approach is the fact that it completely rules out any intangible resources like knowledge from being an incentive of this type of OFDI and only focuses on physical raw materials needed for production purposes (Zaheer & Manrakhan, 2001, p. 6).

(iii) Knowledge-seeking OFDI can be sub-categorised into upstream knowledge-seeking and downstream knowledge-seeking OFDI depending on the type of knowledge aimed for:

Upstream knowledge-seeking OFDI describe an MNE that purchases a target company upstream the value chain which will provide it with product design as well as R&D know-how. Thus it can be considered to be a form of backward integration. Downstream knowledge-seeking OFDI on the other hand is aimed at target companies that are acquired in the context of a forward integration in order to receive knowledge on higher value-added activities (e.g. production or marketing) (Mudambi, 2008, p. 13; Cantwell et al., 2004, p. 7). This is also the reason why the value creation potential is generally higher in downstream knowledge-seeking OFDI. MNEs from developing countries can also seek for knowledge on advanced technologies, management practices and business processes through downstream knowledge-seeking OFDI (Moghaddam et al., 2014, p. 367).

(iv) Efficiency-seeking OFDI solely describes the process of an MNE purchasing a target company that is located at a comparable level of the value chain in order to realise cost reductions through lower labour costs. The distinguishing feature from Dunning and Lundan's original typology is the exclusion of any efficiency gains from internalisation or organisational efforts. Because lower labour costs cannot be found in developed economies, this kind of OFDI can only occur in South-South[5] transactions among companies from developing countries. The value creation prospects of this OFDI method are very limited due to the lack of movement on the value chain on behalf of the direct investor (ibid.).

[5] The term "South-South OFDI" refers to the fact that cross-border investments among developing countries is often restricted to the Southern hemisphere due to their geographical locations (Gonzalez, 2015).

(v) Global value consolidation-seeking OFDI can be utilised to acquire target companies both upstream and/or downstream the value chain. Its primary aim is the consolidation of cost advantages along the entire value chain and optimisation of synergy effect exploitation (Moghaddam et al., 2014, p. 368). This is done on a global scale through the primary aim of internationalisation as well as the utilisation of the strong positioning these MNEs typically enjoy in their home markets (Ramamurti, 2008, p. 18). Operational measures can include the centralisation of non-production-related activities such as administration as well as the increase of bargaining power vis-à-vis suppliers. Since these enterprises want to become global players with strong brands, they also have to face the challenges of "multiple embeddedness" that will arise: business activities in different markets across the globe are very heterogeneous and the importance of understanding local contexts increases with their number (Meyer et al., 2011, p. 236).

(vi) Geopolitical influence-seeking OFDI also can refer to a target company upstream and/or downstream the value chain. This type of OFDI describes the existing connection of a developing country MNE with its home country's government, specifically either a state-owned enterprise (SOE) or private firm with political connections (Moghaddam et al., 2014, p. 369). This means that the MNE's internationalisation endeavours are in accordance with the home government's foreign policy interests and can legitimise certain government policies (Morck et al., 2007, p. 15). This kind of OFDI is in almost all cases a South-South capital flow and is used e.g. to secure long-term supplies of oil or gas of a country but can also pursue a more symbolic meaning to tie countries of the same political orientation closer together (Moghaddam et al., 2014, p. 369).

This revised typology of OFDI methods introduces a value chain-based view on the investing MNE. Bollhorn notes that this allows a direct conclusion to be drawn with regard to the value added that the MNE is planning to implement in a target company (Bollhorn, 2016, p. 71). This theory is therefore very useful to understand the motives of Chinese emerging MNEs acquiring target companies in Germany and shall be utilised in the context of this thesis in the following sections.

2.3 Overview of market entry modes

An enterprise has multiple choices when it comes to the decision which foreign market mode is most appropriate for its purposes. As was established in chapter

2.1.1, in order for a cross-border investment to qualify as an OFDI, it must reach a minimum purchase of voting rights of ten percent. Modes such as franchising, licensing and exporting require no considerable capital commitments in order to be performed and are therefore categorised as non-equity entry modes. They yield low levels of risk but at the same time a low level of control over the foreign operation (Pan & Tse, 2000, p. 538). In accordance with the earlier definition of OFDI, all of the non-equity market entry modes like exporting, franchising or licensing do not belong to the category of OFDI as figure 1 displays and, moreover, are not relevant for the purposes of this thesis.

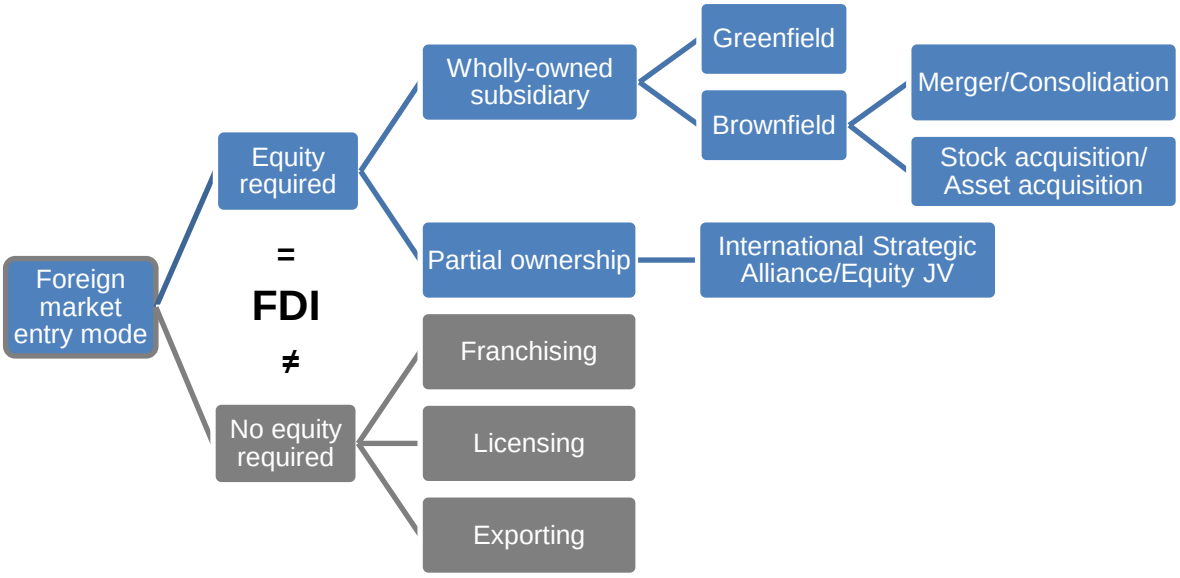


Figure 1: Forms of foreign market entry modes (own figure based on Pan & Tse, 2000, p. 538; Ross et al., 2013, pp. 885-887; Wang, 2009, p. 240; Foltz et al., 2002, pp. 136-137)

At the next level, OFDI can involve full or partial ownership of a target company, the latter of which can come in the form of an international strategic alliance or an international equity JV[6]. Here, at least two enterprises from different countries "create a jointly owned legal organization that serves a limited purpose for its parents", and both have a stake in the JV that does not give either party all of the voting rights (Todeva & Knoke, 2005, p. 3). The involved companies try to capitalise upon a joint competitive advantage which is created by using the synergies when the strengths

[6] The terms "strategic alliance" and "joint venture" are used interchangeably in the majority of the relevant literature.

and weaknesses of both are combined (Morschett et al., p. 281). The advantage of this entry mode is the easy access to local customers, assets and resources through the partnership with a domestic firm, combined with the limited risk in case of investment failure compared to the establishment of a wholly-owned subsidiary in the foreign market (Morschett et al., 2009, p. 288). Especially in developing countries governments regularly demand from foreign direct investors that they enter into an equity JV with a local corporation instead of acquiring it wholly so as to promote the local content of value added (ibid.). A prime example of such policies is China which will be discussed further in chapter 2.6.1.

While in partial ownerships, like international strategic alliances, two partners must cooperate, a wholly-owned subsidiary gives the direct investor full control over the foreign operation through a 100% stake (Raff et al., 2005, p. 1). There are two sub-categories of wholly-owned subsidiaries: greenfield and brownfield investments. A greenfield investment entails that the direct investor builds the foreign operation from the ground up in an empty plot of land that is being purchased (Morschett et al., 2009, p. 305). All types of wholly-owned subsidiaries present the direct investor with a higher risk than equity JVs due to their high investment requirements and barriers, as well as lowered possibility of reversing the transaction in case of failure (ibid.). However, greenfield investments offer no value in target company assets of any kind, and in terms of capital-intensity they are especially risky due to the potentially adverse cost/success probability ratio as well as their less speedy implementability which, in the international ever-changing business environment, is more important than ever (Hill, 2009, pp. 247-248).

The first category of brownfield investments are mergers and consolidations. In a merger, the investing company completely absorbs the target company including all its assets and liabilities leading to the termination of the target company's existence (Ross et al., 2013, p. 885). The shareholders of the absorbed company swap their shares for ones of the absorbing company so that the latter sees its registered capital grow by the total amount of new shareholders (Zhang, 2015). A merger must be voted for by usually two-thirds of share owners of both the absorbing and the absorbed corporation. The advantage of a merger is that it is less cost-intensive and has lower legal barriers to overcome than an acquisition. Consolidations are very similar to mergers and differ only in the fact that instead of one company absorbing the other,

both give up their previous legal existences and form a new corporation (Ross et al., 2013, p. 885).

The second category of brownfield investments are stock or asset acquisitions. In the former, the acquiring company purchases the voting stock of the target company so that it effectively takes over control (Foltz et al., 2002, p. 136). An essential feature of this type of acquisition, depending if it is of friendly or hostile nature, is that the direct investor can evade direct confrontation with the target company's board and management because the shareholders are directly addressed (Morschett et al., 2009, p. 307). In an asset acquisition the acquiring company takes over control by purchasing all of the target company's assets, which has the advantage that no potentially hostile minority shareholders can remain as is the case in stock acquisitions (Ross et al., 2013, p. 886). The two types of brownfield investments can be summarised under the term "mergers and acquisitions" (M&As).

The net value of global greenfield and brownfield investments conducted is roughly the same: according to the UNCTAD, in 2015 the net value of global M&As amounted to 721.5 trillion US Dollars and the net value of greenfield investments to 765.7 trillion US Dollars (UNCTAD, 2016, pp. 204, 210). However, it also becomes clear that developing countries are a more popular destination for greenfield OFDI (468.6 trillion US Dollars) than developed countries (261.5 trillion US Dollars), which attract more M&As (630.9 trillion US Dollars) than the developing world (81.2 trillion US Dollars) (ibid.).

2.4 The role of market entry barriers

Trade barriers can arise whenever an enterprise expands its operations to a country beyond the borders of its home market through any of the foreign market entry modes mentioned in the last chapter, including the ones that qualify as OFDI. There are two basic forms of obstacles that can impede the free flow of goods and services, the first of which are TBs. They can be imposed in the form of import duties or taxes, have largely been abolished by multilateral trade negotiations such as the Kennedy Round (tariff reductions worth almost 40 billion US Dollars in trade) and the Uruguay Round (average tariff reductions of up to 40% worldwide) under the patronage of the General Agreement on Tariffs and Trade (GATT), which will further be elaborated on later, and thus only play a minor role in today's global marketplace (Schaffer et al., 2009, pp. 12, 303).

NTBs play a major role in today's free trade efforts and include all trade barriers that do not come in the form of tariffs (Lorz & Siebert, 2014, p. 179) and ultimately influence "the volume, commodity-composition, or direction of trade in goods and services" (Walter, 1969, p. 18). Most of the time it is not their designated prime purpose to prevent foreign produce from entering the domestic market, but they are administrative regulations or laws deemed necessary to protect the social and economic welfare of a country (e.g. regulations and standards regarding the industry, environment, agriculture or health and safety) (Schaffer et al., 2009, p. 12). NTBs, which are not as strictly disapproved of by the GATT as tariffs, are a common political instrument to promote specific interests of governments which is often helped by difficult access to publicly available information on them (Ray, 1987, pp. 303, 304). A more recent type of trade barrier are technical barriers to trade (TBTs) which occur whenever companies are required to adapt their technical products to different regulations in order to comply with norms regarding testing, certification etc. (Brenton et al., 2000, p. 3). The removal of such trade obstacles, as implemented for example in the Single European Market (SEM), can effectively stimulate trade through lower sales costs for companies (ibid.).

The abovementioned types of trade barriers have a direct effect on global trade flows and volumes through their power to influence the investment decisions of MNEs (Schaffer et al., 2009, p. 13). From this perspective, OFDI can be considered an instrument to evade the cost implied with distributing one's goods to a country imposing TBs, NTBs and/or TBTs by relocating the production to the target country (Hill, 2009, p. 242). If its purpose is to circumvent existing trade barriers, this phenomenon is known as "tariff jumping" OFDI, whereas "quid pro quo" OFDI describes the bypassing of probable future trade obstacles (WTO, 1996). This fact makes the exemption from trade barriers a potential instrument to incentivise foreign direct investors into a domestic market.

Additionally, there are "natural" trade barriers that have impact on trade and investment decisions and that can arise due to cultural differences between the direct investor and the target company (Guiso et al., 2007, p. 6). However, these obstacles cannot be eliminated by liberalisation efforts such as the GATT, but must rather be tackled at the individual firm level through continuous learning and relationship-building (Barkema et al., 1996, p. 1). Thus, the focus of this thesis shall lie on TBs, NTBs, and TBTs.

2.5 History of global FDI development and incentives

2.5.1 Global FDI development 1960 to 1989: an era of liberalisation

After the previous sections have provided an understanding of the ideas behind and functioning of the conduction of OFDI by MNEs, this chapter will turn towards its historic development and origins. In the broadest sense, the history of FDI can be traced back as far as 2,500 B.C. into the age of Sumerian merchants, or the year 1600 when the British East India Company invested in foreign trade activity by setting up branches overseas (Lipsey, 2001, p. 17).

However, a definition of FDI as known today must begin in the post-World War II era. The onset of the UN's first Development Decade initiated by the General Assembly in 1961 marks the point in time when intergovernmental trade policies developed towards a trade integration-friendly global market environment that facilitates cross-country instruments such as FDI (UN, 1961, p. 17). Specifically, throughout the 1960s the UN member states were requested to make "efforts to mobilize and to sustain support for the measures required on the part of both developed and developing countries to accelerate growth […] of the economy of the individual nations […] taking as the objective a minimum rate of growth of aggregate national income of 5 per cent at the end of the Decade" (ibid.). This policy statement by the UN represents an important step towards trade liberalisation and FDI promotion.

The previously introduced United Nations Conference on Trade and Development (UNCTAD) is the key institution when it comes to the promotions and regulatory framework development of FDI. It was established in the early 1960s when a growing number of developing countries began to demand an institution with the dedicated purpose of helping them to integrate into the rising post-war international trade (UNCTAD, 2017). Having come into existence for this reason, it is easy to comprehend why the UNCTAD as well as the FDI literature of the 1960s through 1980s was focusing its theoretical achievements almost solely on the case of capital flows from developed countries to developing countries: there was no need to study the motives of reverse cases since none occurred in the real world. At this early stage of the UNCTAD's trade promotion efforts FDI was not considered a major helping instrument to accelerate economic growth in developing countries. The reason for this was that the targets of IFDI, i.e. companies located in developing countries, were to a large extent under state ownership with centrally planned command economies still common practice (UNCTAD, 2004, p. 128). Countries that formerly were under

colonial rule saw many of their enterprises being nationalised after liberalisation and strategies fostering the substitution of imports towards more autarky were still widely spread (ibid.). Nonetheless, during its first ever gathering in 1964 the UNCTAD established some recommendations that, to a certain extent, are desirable still today:

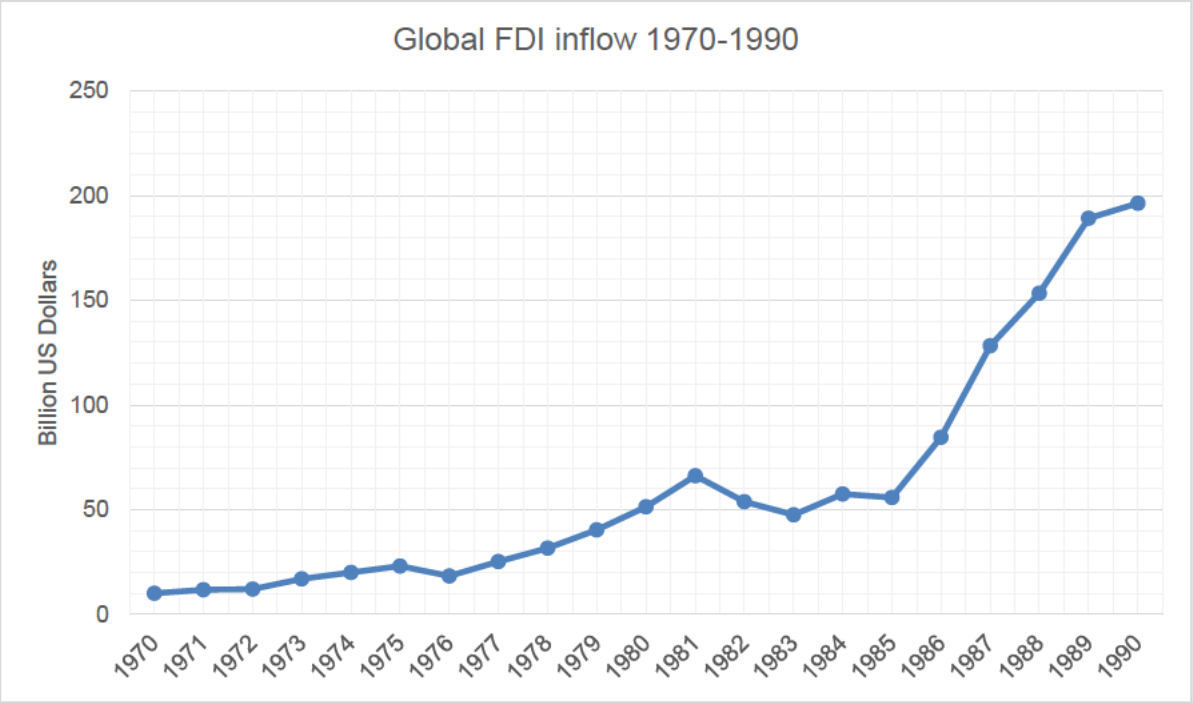
> *"The Conference recommends that foreign private investment, based upon respect for the sovereignty of the host country, should co-operate with local initiative and capital, rely as far as possible on existing resources in developing countries […]. The Conference expects that foreign private investment will recognize the desirability of re-investment of profits in the developing countries concerned, as far as possible, availability of "know-how" to nationals of developing countries and training and employment opportunities to nationals of host countries"* (UNCTAD, 1964, pp. 49-50).

From the mentioning of profit reinvestment it can be deduced that the UNCTAD from the very beginning has understood FDI to be a long-term investment of a strategic nature rather than a tool for quick profit-making. The organisation soon gained international acceptance as a forum at which negotiations regarding the North-South dialogue could be debated among policy makers from many different countries and introduced important universal trade rules such as improved market access for developing countries to developed countries by the Generalized System of Preferences (GSP) of 1968 (UNCTAD, 2017). Despite the UNCTAD's efforts to integrate the developing countries into the world trade, the 1960s and 70s were characterised to a large extent by FDI flowing only between developed ones[7] (Nayyar & Aggarwal, 2014, p. 52).

The attention shifted towards the FDI proceedings of MNEs for the first time in the 1970s, when they were accused of misconduct such as exercising political influence and aiding adverse capital outflows in developing countries (UNCTAD, 2004, p. 128). One of the consequences of the rise of MNEs on the international economy was the abolition of the Bretton Woods System of fixed exchange rates due to the stress that was put on its narrow band of fluctuation by the increasing integration of different national financial markets by the MNEs' global networks of affiliates (Krause, 1972, p. 101). The UNCTAD's efforts in the second half of the 1970s led to the adoption of the "Multilaterally Agreed Equitable Principles and Rules on Restrictive Business Practices" by the UN General Assembly in 1980 (ibid.). This set of rules was aimed at preventing restrictive business practices that could impede the benefits of trade

[7] So-called "North-North" OFDIs as opposed to the earlier mentioned South-South OFDIs.

liberalisation especially in developing countries such as the elimination of competition and innovation or a "concentration of capital and/or economic power" (UN, 2000, p. 9). At the same time, the efficiency of MNEs' investments in developing countries should not be stifled by overregulation, but rather be aligned in accordance with host countries' "national aims of economic and social development" (ibid.).



Graph 1: Total global FDI inflow 1970-1990 *(own graph based on The World Bank, 2016)*

As can be seen in graph 1, total global FDI inflow experienced its first noteworthy increase during the second half of the 1980s with a 239% growth from 55.8 billion US Dollars in 1985 to 189.1 billion US Dollars in 1989 (The World Bank, 2016). This intensification in FDI activity was triggered by global market recessions in the early 1980s plunging many developing countries into debt crises reviving the need for private and externally-sourced capital (UNCTAD, 2004, p. 130). Additionally, more and more countries formerly sympathising with state-planned command economies were now reorienting themselves towards a free market approach with the help of large-scale privatisations which were financed primarily via FDI (ibid.). The majority of FDI still took place among the countries considered "developed market economies" by the UN with 93% of all investments originating from and 81% flowing to them (Nayyar & Aggarwal, 2014, p. 53). The US became a major driver for FDI growth due to its increasing positioning as a negative net investment balance country which was caused by a large capital need from foreign countries (esp. Germany and Japan)

fuelled by a low saving rate in the US economy (Moosa, 2002, p. 17). Overall, this decade proved to be one of strong efforts by the UNCTAD as well as United Nations Centre on Transnational Corporations[8] (UNCTC) to put emphasis on the positive effects of FDI on developing countries by for example providing active support in FDI negotiations for them in the WTO's Uruguay Round (UNCTAD, 2004, p. 130).

In general, during the early phase of FDI development, resource-seeking and market-seeking FDI were predominant. The former was represented by MNEs from developed countries pursuing internationalisation strategies that were focused on securing the supply with primary goods and raw materials of all kinds (Dunning & Lundan, 2008, p. 69). This kind of investment was almost exclusively conducted by MNEs from the industrial countries since the post-war boom years created an ever-increasing demand for production input. Market-seeking FDI was naturally following the MNEs' expansion pressure in the increasingly globalising business environment at that time, in which host countries, in line with the global trend of trade liberalisation, offered more and more incentives to enter their respective markets (Dunning & Lundan, 2008, p. 71).

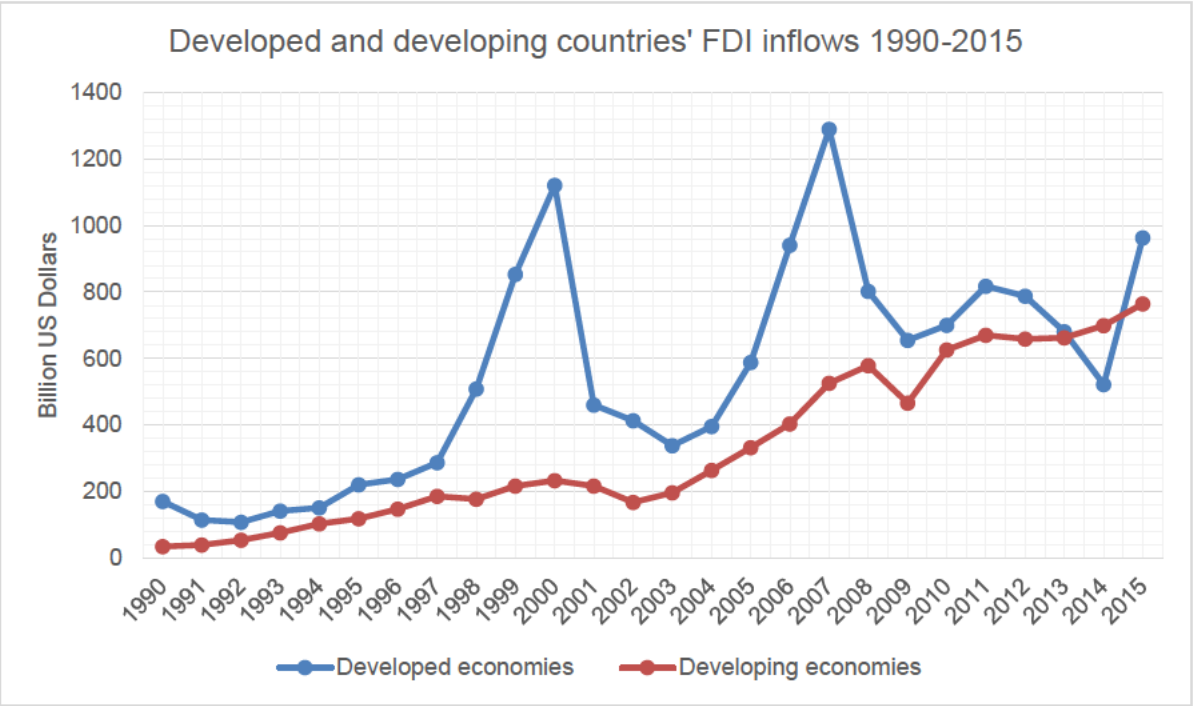
2.5.2 Global FDI development 1990 to today: the developing countries emerge

The 1990s started with a brief period of global economic recession (Moosa, 2002, p. 17), but after 1992 the economic environment became very FDI-friendly with developments such as the end of the Cold War, the implementation of the European Communities' (EC) SEM, and a global tendency towards regional trade integration (UNCTAD, 2004, p. 131). One major reason for the steep incline in FDI that occurred in the second half of the 1990s was the Uruguay Round's establishment of the World Trade Organization (WTO) as well as the General Agreement on Trade in Services (GATS) in January 1995 with its "credible and reliable system of international trade rules; ensuring fair and equitable treatment of all participants" (WTO, 2017). This opened the entire sector of services for FDI greatly increasing its potential reach past the scope of its merchandise trade counterpart, the GATT (Moosa, 2002, p. 17). Also on the national level the openness towards and protection of foreign investors enhanced to a large extent which was reflected in the establishment of FDI promotion agencies in most countries in order to actively attract inward FDI into the respective

[8] The UNCTC was in existence between 1974 and 1993, when its tasks were transferred to the UNCTAD (UN, 2009, p. 1; UNCTAD, 2004, p. 131).

host country (UNCTAD, 2004, p. 131). With the forces of globalisation gaining ever-more momentum through the advances in information technology in the course of the 1990s, FDI manifested its position as an essential pillar of economic progress (UNCTAD, 2017). During its 9th session in Midrand in 1996, the UNCTAD on the one hand labelled FDI "to be an instrument through which economies are being integrated […] into the globalizing world economy" (UNCTAD, 1996, p. 14). On the other hand, it stressed the importance of a reliable, consistent and transparent legal framework that promotes fair treatment of all investors in host countries that had become more essential than ever before (ibid.).

One of the most important developments for the global FDI landscape during this time was China's decision to open its domestic market for foreign investors from the mid-1990s onwards thereby enabling the attraction of an immense amount of IFDI (Schmidt & Heilmann, 2012, p. 77). This IFDI regime liberalisation was characterised by strict guidelines regarding market entry modes as well as a gradual increase in permitted foreign ownership and control levels (Lui et al., 2005, p. 99) and quickly made China the largest IFDI recipient of all developing countries (Nayyar & Aggarwal, 2014, p. 55). In the 1990s for the first time OFDI from developing countries rose to noteworthy amounts: 6% of all OFDI originated in non-developed economies while it was only 1% in the late 1970s (te Velde, 2006, p. 7). Until then, China had been successful in attracting foreign capital but had only played a minor role in OFDI with being responsible for 3.4% of all developing countries' OFDI between 1994 and 1999 (Cheung & Qian, 2008, p. 1). The 1997-99 Asian financial crisis was the stimulus for the Chinese central government to liberate its OFDI policies so that also non-state-owned enterprises were able to invest abroad marking an important change of direction away from only attracting IFDI (Cheung & Qian, 2008, p. 3). This policy was reinforced by the Chinese government upon China's entry into the WTO in 2001 when it actively encouraged its SOEs to expand to foreign markets (Schmidt & Heilmann, 2012, p. 80). The late 1990s and the 2000s thus displayed a steep increase in Chinese OFDI from 2.56 billion US Dollars in 1997, to 12.26 billion US Dollars in 2005, to 56.53 billion US Dollars in 2009 (UNCTAD, 1999, p. 485; 2011, p. 189).



Graph 2: Developed and developing countries' FDI inflows 1990-2015 *(own graph based on UNCTAD, 2016)*

As becomes apparent from graph 2, the positive trend of the late-1990s only lasted until 2000 when global FDI reached unprecedented levels. There, the graph indicates a sharp and sudden drop towards the subsequent year 2001 as well as a continued downwards development up to the year 2003, when IFDI inflows of developed countries almost fell to the level of the mid-1990s. It further reveals that IFDI inflows to developing countries did not participate in the developing countries' sharp in- and decline anywhere near as strong. In 1999 and 2000 the major OECD countries experienced a wave of M&As that was accompanied by MNEs' heavily restructuring and repositioning affiliates under FDI utilisation (OECD, 2002, p. 2). In addition to the increase in M&A volume, the average value of each M&A transaction increased leading to an, at least partial, overvaluation of expected corporate profitability (ibid.). After this "investment bubble" had burst in 2000 and 2001, direct investors readjusted their valuations of target companies to more realistic levels and M&A volume as well as value decreased to pre-boom levels (OECD, 2002, p. 7).

This downward trend in FDI was also reflected in IFDI inflows to developing countries. Here, the global positive attitude towards FDI at the beginning of the new millennium had cooled down due to host countries, that had actively attracted IFDI with high expectations, being disappointed by underperforming investment projects (UNCTAD, 2004, p. 134). After the openness towards it, the disillusionment that foreign capital

was not a development instrument with the scope to surrogate the fundamental importance of domestic investment found widespread acceptance (ibid.).

From 2003 onwards IFDI began to gain momentum again and especially the aforementioned increasing participation of China on the global FDI landscape has led to IFDI in developing countries reaching unprecedented values of over 578 billion US Dollars (UNCTAD, 2016). The FDI flows to developing countries in recovered particularly fast from the 2000-01 shock. Graph 2 indicates a new historic record high at 1,289 billion US Dollars which was, once again, largely driven by M&A mega deals that were backed by private equity funds (UNCTAD, 2010, p. 12). These funds were hit hard by the 2007-10 global financial crisis and saw their investment volumes and values drop sharply due to the arising risk aversion of investors which reflected the overall mood on the financial markets in the developed world (ibid.). While here in the first year of the crisis 2007 IFDI inflows contracted by more than 37%, the developing economies displayed more resilience with an increase of 10% (UNCTAD, 2016). The reason for this inverse development in the first phase of the crisis, lasting from August 2007 to the bankruptcy of Lehman Brothers in September 2008, is the fact that it affected especially banking flows among developed countries because here the market actors fell into an acute “liquidity panic” (Milesi-Ferretti & Tille, 2011, pp. 12; 20-21). This meant that developed countries, which display a higher extent of debt and banking activity i.e. financial integration, were more exposed than developing countries to the contraction of financial capital flows (ibid.). It was only in the crisis’ second stage between the last quarter of 2008 and the first quarter of 2009 that developing countries’ IFDI flows contracted by almost 20% (UNCTAD, 2016). This period of time “was characterized by a broad reversal of capital flows, with investors across the globe liquidating holdings abroad” and was not limited to the sphere of the developed countries but affected the developing world, too (Milesi-Ferretti & Tille, 2011, p. 1). From the second quarter of 2009 onwards, the third and last stage of the crisis saw “a quick recovery of non-bank capital flows” that also include FDI so that already in 2010 the developing countries in particular experienced an upsurge in IFDI flows that surpassed all past records at 625.3 billion US Dollars (UNCTAD, 2016; Milesi-Ferretti & Tille, 2011, p. 1). To this date, IFDI flows to developed countries remained below pre-crisis levels reflecting the persisting risk aversion which allowed developing countries’ IFDI to exceed those of developed countries for the first time in 2014 (ibid.).

A general contemporary trend in FDI is that the developing world is not only a major recipient of IFDI anymore, but is also catching up in the search for target companies across the globe. Since the beginning of the millennium MNEs from especially Brazil, Russia, India and China (BRIC) countries have either already taken leadership in their respective markets or are on the way to the top thereby increasing competitive pressure on enterprises from the developed economies (Bollhorn, 2016, p. 67). In chapter 2.2 it was found by Moghaddam et al. that BRIC countries follow an adapted version of the original typology of foreign direct investors that was proposed by Dunning & Lundan. In the past BRIC countries were focusing on OFDI targeted at developing countries so that for example China in the period from 2002-05 channelled 71% of its OFDI to developing countries and 23% to developed ones (Voss, 2011, p. 70). The underlying strategies of this trend were either a natural-resource seeking and an end-consumer-market seeking one which becomes clear when examining the ratio of the primary[9]/manufacturing sectors to the services sector of Chinese investments of roughly 80/20% in the developing world during this time (Voss, 2011, p. 88). Chinese direct investors in 2007 were active in almost 50 African countries implementing projects relating to oil mining, public building renovations, tourism promotion and infrastructure development of roads, harbours, electricity, or mobile phone networks (Zafar, 2007, p. 105). In return for this form of development aid China received natural resources of all kinds, a guaranteed political support and millions of new customers for its domestic producers (ibid.).

The abovementioned “first wave of Chinese outbound FDI mostly targeted resource-rich developing economies”, however, in recent years the BRIC countries, above all China, have extended their OFDI activity to Europe in their search for target companies in advanced economies: China’s annual OFDI in Europe has risen from negligible amounts at the beginning of the new millennium to a value of 20 billion Euros in 2015, up from 14 billion Euros in 2014 (Hanemann & Huotari, 2015, pp. 5, 12; 2016, p. 2). In line with the previous findings, such a shift from investments in developing countries to ones in developed countries is accompanied by a change of underlying investor motivation. The three main incentives of these MNEs are found to be end-consumer market-seeking OFDI, followed by knowledge-seeking, and global value consolidation-seeking which supports the observation that the

[9] The primary sector of the economy in this case comprises of “investments in fishery, timber and other agricultural products” (Voss, 2011, p. 89).

international expansion paths of developing country MNEs differ substantially from developed country ones (Moghaddam et al., p. 369).

2.6 Sino-German FDI transactions

2.6.1 China-targeted OFDI from Germany and the Chinese FDI regime

In addition to a brief historic overview, this chapter will identify the underlying motivational factors of German OFDI in China as well as introduce the legal regulations faced in order to provide an understanding of the differences Chinese investors face in Germany. Chapter 2.6.2 will subsequently analyse the same issues for the reverse case, namely Chinese OFDI targeted at Germany.

As was mentioned earlier China gradually opened its domestic economy to foreign investors from the mid-1990s onwards. In fact, China had already established so-called special economic zones as soon as 1979 which allowed direct investors a first contact with Chinese business partners (Schmidt & Heilmann, 2012, p. 77). However, these did not allow for free location choice on behalf of the investor and are not considered as “FDI” as defined by this thesis before. With the beginning of the reform and liberalisation policies in the late 1970s and early 1980s the Chinese government began to promote OFDI flows (Meyer, 2017, p. 5).

China’s legal framework regulating the activities of foreign business players from the very beginning differed extensively from that dealing with local actors due to the unique way the government had implemented what is known as a “dualistic legal system” in the literature and what is based on nationalities (Stursberg, 2014, p. 11). This means that despite a universally applicable stock company law being in existence, the government over time has created a special corporate legislation consisting of a number of separate laws like the “Equity Joint Venture Law”, the “Contractual Joint Venture Law” and the “Wholly Foreign Owned Enterprise Law” (Meyer, 2017, p. 13). These special laws are superior to the domestic stock company law and apply depending on the legal personality assumed by the foreign investor (ibid.). Especially in its early days, the dualistic framework was considered to be discriminatory against foreign investors offering less favourable conditions than for domestic investors (Meyer, 2017, p. 5).

When China entered the WTO in 2001 the central government implemented gradual reforms of the dualistic system and harmonised regulations for foreign and domestic investors in terms of e.g. contract and taxation law (Stursberg, 2014, p. 12). Some of

these reforms were mandatory to successfully enter the WTO, others were carried out because officials realised that in order to sustainably attract foreign investors into the country a more transparent and reliable legal system was necessary (ibid). Moreover, the WTO-accession opened the Chinese market for new sectors, especially the service sector, and as a consequence also small- and medium-sized enterprises (SMEs) from Germany as well as MNEs from the services sector invested in the country (Wang, 2014, p. 2; Deutsche Bank, 2004, p. 3).

As of today, the applicable investment legislature for foreign investments is still a complex network of individual laws that consists of a mixture of state-level and province-level laws, regulations as well as administrative orders the respective jurisdictions of which differ from region to region (Meyer, 2017, p. 6). Additionally, local authorities can implement deviating laws for the numerous special economic zones that exist throughout the country that amend the central legislature (ibid.). The core element of Chinese inward and outward FDI guidance and regulation is the "Catalogue for the Guidance of Foreign Investment Industries" (hereafter referred to as the "Catalogue") which is released by the National Development and Reform Commission (NDRC) and the Ministry of Commerce (MOFCOM) and approved by the State Council (FDI Invest in China, 2015). The latest version of the Catalogue was released in March 2017 and reflects the ongoing efforts of the Chinese government to lift restrictions and obstacles for foreign investors (Koehler Group, 2017, p. 1). With every new edition of the Catalogue the number of categories requiring a Sino-foreign equity JV or a minimum stake of a Chinese company in an operation has been reduced (ibid.). However, these restrictions still remain in the i.a. aviation, automotive as well as banking industries (Meyer, 2017, p. 9). There are four categories of IFDI, ranging from "encouraged", "permitted", and "restricted" to "prohibited" projects, each of which contains sectors of the economy the government thinks can either benefit from IFDI or should be protected from it respectively (Minster Ellison, 2015, p. 2). The main aim of the Catalogue is to enable the government to directly steer economic development in terms of geography, sector, and IFDI incentivisation (Meyer, 2017, p. 10). An important feature of IFDI conduction in China is the fact that, due to the Catalogue's regulations, investors cannot freely choose between the market entry modes introduced in chapter 2.3, but must consent to use

a government-approved investment vehicle[10] instead (Bu, 2009, p. 198). Thus, the investment vehicle and its according special corporate law in the case of certain industries can be dictated by the category the Catalogue classifies it in.

Historically, the companies that entered the Chinese market in its early years of IFDI activity are generally labelled pioneers and the first German companies to conduct OFDI in China were mainly large and renowned MNEs from the automotive, electronics, chemicals and machinery industries like Volkswagen (1984), Bayer (1994) and Siemens (1994) (Deutsche Bank, 2004, p. 3; Volkswagen Group China, 2017; Bayer China, 2017; Siemens China, 2014). Their main motivators were on the one hand a better understanding of local customers' needs through improved closeness to the market. On the other hand they considered OFDI as an effective way to circumvent the immense customs barriers in place at that time for e.g. automobiles (Schüller, 2010, p. 13). As can be seen in graph 3, the volume of German OFDI to China experienced an upswing after the aforementioned liberalisation efforts accompanied by China's WTO accession from the early 2000s onwards.

Graph 3: OFDI investment volumes between Germany and China 2001-2016 *(own graph based on UNCTAD, 2014; Evans, 2017; GTAI, 2014, p. 6; Statista, 2016; OANDA, 2017)*

Up until 2015, business relations with China had developed so intensely that, not taking into consideration other EU member states, the country had become

[10] There are numerous investment vehicles in China for foreign investors the legal definition of which would go beyond the scope of this thesis (see Meyer, 2017, pp. 17-25).

Germany's most important trading partner making up 7.5% of Germany's total foreign trade (AHK Greater China, 2015, pp. 1-2). In terms of German OFDI in China, the stock increased 9-fold from 116 billion to 1,144 billion Euros between 1990 and 2011 representing an average growth of 50 billion Euros per year (Wang, 2014, p. 1). As of 2015, approximately 5,200 companies from Germany had conducted OFDI in China which in 90% of cases was located in or around China's top three economic hubs of Shanghai, Beijing and the Guangzhou/Shenzhen area (AHK Greater China, 2015, p. 3).

The most important incentive for German companies to invest in China is to gain access to the market and key customers there (PwC, 2015a, p. 5). They are not seeking a low-skill and low-cost labour force but are increasingly involved in high-tech industries that drive China's industrial landscape upwards on the value chain (AHK Greater China, 2015, p. 3). Furthermore, Schmidt and Heilmann point out that by 2010 about 80% of all OFDI-backed operations were wholly foreign-owned subsidiaries as opposed to Sino-foreign JVs under Chinese ownership (Schmidt & Heilmann, 2012, p. 80) thus supporting the earlier finding that the government displays a continuous progression towards a more liberal and transparent treatment of IFDI. This trend is likely to continue in the future with the Catalogue lifting restrictions on more and more industry sectors for foreign investors with every new edition of it. However, a consistent and uniform legislature that applies to all IFDI activities throughout China is yet to be released and until then investors must accept the fact that here their investment is under the permanent control and arbitrariness of the government, more than in most Western economies. Additionally, it is reported that in the last two to three years the number of German companies complaining about a growing "economic nationalism" that demands full technology and know-how disclosure of foreign investors in China as well as about a new ranking system for the tendering of large public infrastructure projects have strongly increased (Landwehr, 2016). While China protects the industries it considers too strategically important for foreign M&A, Chinese companies until now can easily acquire German companies from the high-tech, automotive and financial sectors, as will be discussed in the next chapter. Nevertheless, for German business actors the potential access to the second most-densely populated country on earth seems to countervail these possible risks.

Generally, China's rapid growth has to a certain extent slowed down in the recent past and given way to a more moderate and sustainable way of economic expansion

(Dizioli et al., 2016, p. 5). This is part of a structural change the Chinese economy is currently experiencing and which puts quality before quantity and a larger emphasis on the services sector (AHK Greater China, 2015, p. 6). Even though industrial manufacturing will continue to be of great importance, this current trend is accompanied by a general decrease in Chinese output in key German industrial sectors which in turn is reflected in falling German OFDI activity in China (AHK Greater China, 2015, p. 5).

2.6.2 Germany-targeted OFDI from China and German FDI regulations

After chapter 2.5.2 has already provided insights on the general aspects and development of Chinese global OFDI activities and the previous chapter has described FDI flows from Germany to China, this section focuses on the main subject of this thesis: Chinese OFDI in Germany. In 2017 Michael F. DeFranco of Baker McKenzie pointed out the following:

> *"Well over half of all Chinese direct investment into Europe and North America since 2000 has taken place in the last three years, marking the continued influence of globalization and the rapid development of China's economy."* (DeFranco, 2017).

This statement depicts that Chinese foreign investments are a young phenomenon especially when compared to the long history of OFDI among the developed world countries. With triggers such as the Asian financial crisis of 1997-99 as well as China's WTO accession in 2001, the country's government actively encouraged domestic companies to directly invest in countries across the globe (Schmidt & Heilmann, 2012, p. 80). The predominant market entry strategy chosen by Chinese investors in Germany are M&As which account for 82% of all transactions (Hanemann & Huotari, 2015, p. 16). China sees Germany as a source of technological know-how, high quality products, and skilled workforce, as well as a door opener to the European market and its consumers (Jungbluth, 2016, p. 5). In a study Bollhorn found that the main motivators of Chinese M&A investors in Germany are the extension of existing product and service portfolios, sales increase as well as the access to local R&D (Bollhorn, 2016, p. 77). Reform projects liberalise the Chinese corporate landscape increasingly and allow for the liberalisation of former SOEs which, when in private hand, are more likely to internationalise their business activities to European countries such as Germany (PwC, 2015b). Nevertheless, the share of acquisitions

conducted by SOEs in Germany between 2014 and 2016 amounted to about 24%[11]. Apart from the political motivations, the concerns with SOEs' investments include lacking transparency and communication as well as obscure economic intentions (BDI, 2013, p. 10).

As can be deduced from graph 3, Germany has been a continuous destination of Chinese OFDI, but the transaction volumes have experienced a sharp upswing from 2014 onwards and reached their historic peak of 12.1 billion US Dollars in 2016. At the same time the total amount of M&As has also reached its highest annual number: in 2016 68 German companies came under Chinese ownership compared to 40 in 2015, 36 in 2014, 22 in 2011, and 4 in 2007 (EY, 2017, p. 7). These statistics display that the value of every individual M&A transaction has strongly increased over the last few years. Examples for these "megadeals" are acquisitions like *ChemChina's* purchase of the *KrausMaffei Group* for 925 million Euros (KraussMaffei Group, 2016) or *Midea's* purchase of *Kuka AG* for 4.7 billion US Dollars (FAZ, 2016). The majority of deals however involves medium-sized enterprises of which the Chinese investors usually purchase 100% of assets at once (Spiegel Online, 2016). This accumulation of Chinese acquisitions over a short period of time has led to public preconceptions about Chinese investors absorbing the German SME landscape (Handelsblatt, 2016). The widespread concerns revolve around the core fear that emerging Chinese MNEs acquire globally renowned German SMEs with a long tradition, only to gain access to their high quality and know-how that they have developed over their long history. The general concern is, that after the workers in China have achieved the skills to reproduce this "Made in Germany" quality, the German subsidiaries are liquidated and the workers laid off (ibid.).

At the latest by the announcement of the Kuka acquisition the German government felt obliged to react to this mood shift in the economy and repeatedly voiced concerns about the fairness and reciprocity of OFDI from China and their nature of an extended arm of the Chinese government's interests (WirtschaftsWoche, 2016; Süddeutsche Zeitung, 2016). Especially acquisitions by SOEs, which were found to occur regularly earlier, fuel the concerns about the latter issue. The culmination of this call for industry protection came in the form of a joint proposal paper initiated by Germany and signed

[11] Own calculation based on Jungbluth, 2016, pp. 8-10.

by different EU countries' economy ministers titled "Proposals for ensuring an improved level playing field in trade in investment" (BMWi, 2017). This document quite obviously is a direct reaction to the recent trend of Chinese MNEs heavily investing in the EU proposing that EU governments should be able to prohibit foreign acquisitions especially "in cases where a foreign investor has only limited market access in the country of origin of the acquisition (e.g. by being forced to set up a joint venture or through the exclusion of foreign investors in certain sectors)" (BMWi, 2017, p. 2). This can be considered to be a direct reference to China's Catalogue and the various other obstacles described in the previous chapter faced by German companies investing in China.

To this date opinions about a potentially rising level of protectionism on behalf of the German government are a controversial issue. While some sources state that the installation of such trade restrictions is against the foundations of the free market principles of Germany and the EU, others note that if the acquisition boom continues the growing number of Chinese majority shareholders will soon be able to actively influence Germany's investment politics themselves (Jungbluth, 2016, p. 7). A final decision on how to handle large-scale megadeals in the future has not been made at the time of the composition of this thesis, however, the decision of the German government to cancel the acquisition of the German company Aixtron by the Chinese investor Grand Chip Investment in late 2016 after US President Obama declared security concerns, can be considered to be a trendsetting decision that will potentially complicate future transactions (Seibt, 2016).

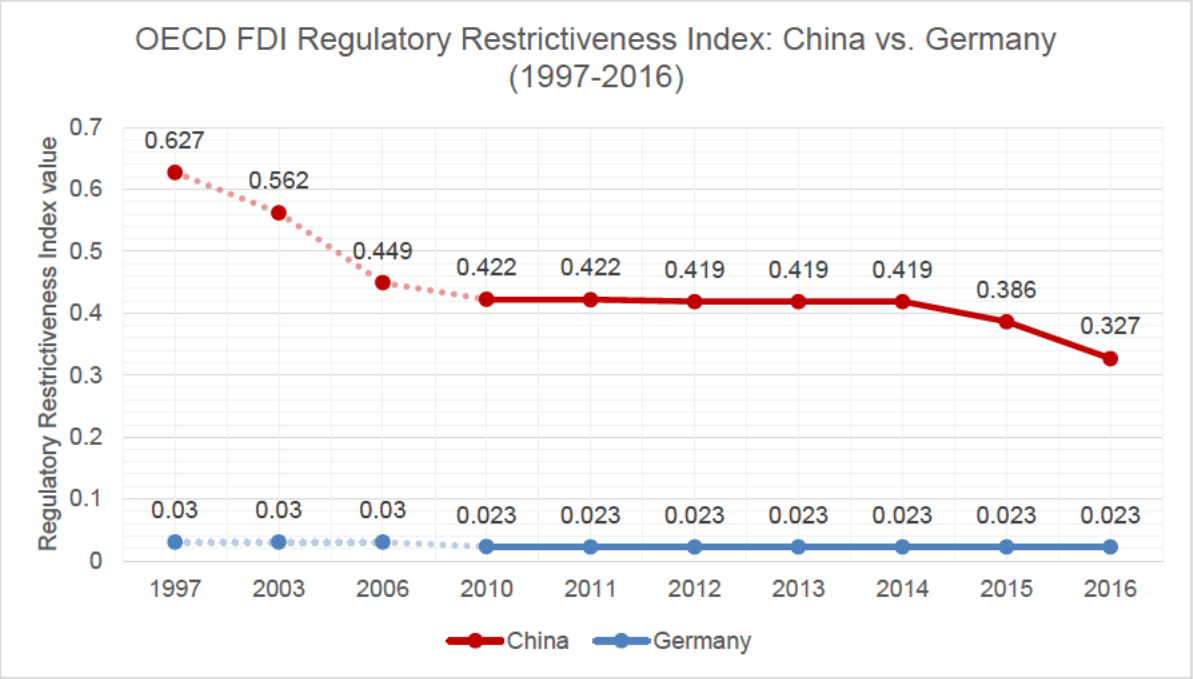
A few years back, before the record-breaking boom in acquisitions of German firms, the attitude towards IFDI from China was a different one. On 16th January 2014 the Chinese Chamber of Commerce in Germany (CHKD) was inaugurated in Berlin (CHKD, 2014) and high-ranking politicians like the German Minister for Economic Affairs Sigmar Gabriel expressively invited Chinese companies to conduct OFDI in Germany and announced that scepticism about Chinese investors should be dispelled (Reuters, 2014). As becomes obvious the mood in 2017 is in stark contrast to the one three years ago.

Germany's legal framework for IFDI reflects this undiscriminating and open position towards foreign investors. While the country is signatory to the OECD rules of

National Treatment and Codes of Liberalization of Capital Movements, German legislation itself grants foreign investors full national treatment if the foreign-owned enterprise is incorporated as a limited liability company (GmbH) or as a joint stock company (AG) (U.S. Department of State, 2013). Furthermore, also foreign directors or shareholders are treated equally to those with a domestic background due to the lack of special nationality requirements (ibid.) There are no specific incentives utilised to attract IFDI into certain industries, but the government's economic development agency Germany Trade and Invest (GTAI) promotes Germany as a business-friendly and high-tech location on a more general level (Export.gov, 2017). Foreign-owned enterprises are subject to the same regulations as domestic firms in terms of e.g. corporate tax, labour law, contract law etc. (ibid.). Additionally, foreign investments are subject to the same regulations of competition law as domestic ones and can be prohibited by the Federal Cartel Office as well as the European Commission (BDI, 2013, p. 11).

However, according to the German Federal Act on Trade, under certain conditions (investor from non-EU or non-EFTA country conducting investment larger than 25% in weaponry or cryptographic equipment producing business) since 2004, IFDI can be subject to a screening process which can raise objections to the investment (Export.gov, 2017). Additionally, since 2009 the Capital Investment Code (formerly German Foreign Investment Act) places restrictions on IFDI that poses a threat to national security or the public order (ibid.). These national-level restrictions coexist with the EU-level legislation that, since the coming into power of the Lisbon Treaty in 2009, transfers jurisdiction for IFDI to the EU (BDI, 2013, p. 11).

The aforementioned measures introduced for foreign investment in Germany display a slight tendency towards a rise in protectionist thinking in the period between 2004 and 2009. Although no further restrictive instruments have been established since then, the current acquisitions boom in 2016-17 and the call for such mechanisms by a growing number of public figures may lead to a more constrained environment for IFDI in Germany.



Graph 4: OECD FDI Regulatory Restrictiveness Index: China vs. Germany (1997-2016) *(own graph based on OECD, 2017)*

Nonetheless, in graph 4 the OECD's FDI Regulatory Restrictiveness Index, which indicates high restrictiveness of a country with a high index, displays a consistently open attitude towards IFDI in Germany. In comparison, the Chinese index is larger many times over compared to the German one reflecting on the one hand the findings on market liberalisation efforts of chapter 2.6.1, and on the other hand the unequal investment conditions faced by German investors in China and vice versa.

3 The host country perspective: externalities and absorptive capacity

3.1 Host country externalities from IFDI

3.1.1 Mainstream theories of host country externalities IFDI

The concept of host country externalities[12] (HCE) which can positively affect the target country on several levels is a major driver for policy makers across the globe to attract IFDI into their economies by liberalising investment restrictions (Blomström & Kokko, 2003, p. 2; Lu et al., 2016, p. 2). As their name suggests, HCEs assess the effects of IFDI from a macro-economic country-level perspective. However, often these macro-economic factors are triggered by firm-level micro-economic events which in turn are a direct effect of an IFDI transaction (ibid.). The positive externalities of IFDI directly translate into the motivational factors policymakers and target

[12] The terms "externalities", "spill overs", or "external effects" are used interchangeably in the literature (Jordaan, 2004, p. 27). This thesis will use the term "externalities" exclusively to provide a uniform understanding.

company owners have. Naturally, the incentives and benefits for target companies in host countries at which the capital from IFDI transactions is directed differ considerably from those of the direct investor described in chapter 2.1. This chapter will therefore provide an understanding of IFDI types as well as the mechanisms of HCEs. It will discuss the mainstream IFDI theories' approaches which solely apply for IFDI flows from developed to emerging countries. Chapter 3.1.2 on the other hand will examine the specific case of externalities from Chinese OFDI in the German economy.

In general, the main objective for host countries to allow IFDI within their boundaries is to acquire "technologies and skills they do not yet possess" (Blomström et al., 2000, p. 101). From the host country's perspective IFDI can be classified into (i) import-substituting IFDI that refer to goods that were previously imported to the host country and are now being produced within its borders implying a close dependency on possibly existing TBs and NTBs that were examined in chapter 2.4, (ii) export-increasing IFDI by which the direct investor takes over the suppliers of raw materials or semi-finished products for an efficiency-increase in supply for its subsidiaries located in other countries thereby increasing exports of the host country, and (iii) government-initiated IFDI that is utilised by a host country's government to offer specific incentives to direct investors to make its domestic market more attractive for IFDI than others (Caves, 1971, pp. 10-11).

In the mainstream literature which deals with investments from developed to developing countries, import-substituting IFDI is effectively the direct investor's aim of tariff jumping as viewed from the target country's perspective (WTO, 1996). In fact, highly restrictive TBs were often used as an instrument to actively attract IFDI that helps to develop the local production of goods (ibid.). This shows that the described three types of IFDI most of the time are interdependent: an import-substituting IFDI will increase local production of a formerly imported good, but at the same time it may lead to increased exports of the host country (e.g. intermediate goods) due to the existence of a new industrial production facility. Additionally, this process might have been initiated by the government through investor incentives. It becomes obvious that the relationship between IFDI and home- and host-country trade is highly complex and thus literature on it is mostly limited to empirical observations (ibid.).

In general, the externalities of such IFDI can be defined as “being present when the actions of one agent directly affect the environment of another agent” (Papandreou, 1994, p. 5). This definition has been consulted frequently to describe the relationship of MNEs and their subsidiaries whose actions directly influence the economic environment of their mothers and vice versa. Consequently, the underlying rationale of externalities from IFDI is that the total social welfare gains “must exceed that internalized by the foreign entrant and its host economy partners” (Blalock & Gertler, 2005, p. 73) or otherwise the investment could as well be conducted by a domestic investor without the FDI-entailed cross-country risks.

There are two basic types of externalities which can be distinguished by the manner they affect the host country’s market conditions. The first type are technological externalities which are not directly linked to the market mechanisms of the host economy, but emerge only from the direct interaction between the foreign investing company and the domestic target company (Jordaan, 2004, pp. 34-35)[13]. Secondly, there are pecuniary externalities which result from the presence of a foreign-owned target company in the domestic market but are transmitted to the economy through market mechanisms (ibid.). In the relevant literature, the boundaries of these two concepts of externalities are often intermingled and the concepts summarised under the terms “technological externalities” or “technology spill overs” (Jordaan, 2004, p. 36). Thus, this thesis hence onwards will use the term “externalities” to describe both technological and pecuniary externalities in the host country economy.

Instead of the above mentioned poorly demarcated distinction by Dunning, this thesis introduces a more straightforward categorisation for the externalities from IFDI introduced by Hill (2009, pp. 257-260):

(i) resource-transferring externalities,
(ii) employment-affecting externalities,
(iii) balance-of-payments-affecting externalities, and
(iv) competition and economic growth-affecting externalities.

(i) Resource-transferring externalities represent the broadest category of IFDI-induced effects on the host economy. The investing MNE enables the target company to have easier access to capital either from its own resources, or from the capital

[13] The original definition of technological externalities was made by Dunning, 1993, p. 446.

markets through the market power of the large parent. In many cases, this capital is used to help accelerate R&D efforts in the host country's economy. Blalock and Gertler add the capital's function as a "liquidity insurance" for target companies for which the parent company acts as a safety net in times of crises (Blalock & Gertler, 2005, p. 76). Furthermore, according to Hill (2009, pp. 257-260) especially developing countries can benefit from already existing process or product technologies which are introduced by the direct investor in the target company. Lastly, resource-transferring externalities can also include management expertise and techniques that are transferred to local employees by foreign managers. This managerial know-how can spread throughout the host country's economy in case the trained local workers leave the company e.g. to start their own company, or through stimulation of local suppliers and distributors who are in contact with the target company (ibid.).

(ii) Employment-affecting externalities can either directly affect the host country's economy through the creation and/or retention of jobs in the target company, or indirectly through the creation of jobs along the value chain in supplying or distributing companies. Hill notes that the indirect effects oftentimes exceed the impact of direct effects, however, the jobs established through IFDI at the same time are likely to lead to lay-offs in competing companies through their loss of market share. Further, the direct investor initially might plan to strategically lay-off employees in order to restructure the target company and restore its competitiveness, the lack of which in many cases was the reason for the target company to search for foreign capital in the first place (ibid.).

(iii) IFDIs' balance-of-payments-affecting externalities are especially important to policymakers of host countries who prefer to maintain a positive current account of their balance of payments (BOP), i.e. the country is exporting more goods than it is importing from abroad. If, like is the case with the US, a country is running a permanent current account deficit, it must sell domestic assets to foreigners e.g. by attracting IFDI. Hill annotates that despite appearing to be a decrease in domestically-held assets on the surface, IFDI can actually support a positive current account through indirect externalities such as the stimulation of exports from the target companies the direct investors have invested in (ibid.).

(iv) Competition and economic growth-effects of IFDI result from mere establishment of new (greenfield FDI) or better-performing (brownfield FDI) competitors in the

marketplace. This in turn fuels capital investments by firms in their production facilities and/or R&D projects as they need to defend their “competitive edge”. From a macro-economic long-term perspective such developments are likely to lead to overall gains in productivity, innovation levels of products as well as processes, and the economy in general. Hill adds that this ultimately benefits the domestic consumers through better and more differentiated products as well as lower prices (Hill, 2009, pp. 257-260).

While all of the above potential positive externalities may sound promising to policymakers, IFDI can also lead to negative externalities that basically reverse all of the above-described IFDI-induced effects into their respective contrary. Jordaan emphasises that existing studies on the effects of IFDI present widely variable results which make it impossible to predict them on a generalised level, but that such an externality analysis must always be considered to be a case-related study with outcomes that highly vary with the researcher’s expressed aims (Jordaan, 2004, p. 83). More specifically, these negative externalities of IFDI can include excessive market power of acquired target companies through subsidies from the investing MNEs, worsening of the host economy’s BOP through acquired target companies sourcing building components from the countries-of-origin of their parent MNEs, and loss of economic independence and authority in case of unethical or uncommitted conduct of the parent MNEs (Hill, 2009, pp. 260-261).

There is little literature that analyses which of the above-described HCEs typically occur in FDI from developed to developing countries, and which are predominant for the opposite case. In theory, all of the mentioned externalities can apply in both directions of FDI as every transaction is unique and to be assessed on a case-to-case basis. But, consistent with the differing motives of foreign direct investors from developed and from developing countries, the externalities can extensively vary between IFDI target companies located in a developed and a developing economy. The next chapter will analyse which externalities are likely to occur in the case of Chinese OFDI in Germany through a review of already completed transactions.

3.1.2 Host country externalities of Chinese IFDI in Germany

In recent years Chinese OFDI in German companies has reached record levels in terms of quantity and volume as was found in chapter 2.6.2. Therefore, a deeper review of HCEs experienced by German target companies seems appropriate. As

was mentioned before, reviews of such IFDI investigations are always of a case-based nature, thus, this chapter will examine each of the introduced types of externalities described by Hill and analyse whether they could be observed in Sino-German FDI activity. The aim is to provide an understanding of which HCEs are commonly occurring when Chinese MNEs acquire German companies. Oftentimes macro-economic host country-level externalities are triggered by firm-level effects of IFDI so that the following analysis will also take into consideration micro-economic developments that have led to the country-level externalities. For the purposes of this thesis, eleven observable developments that can entail HCEs have been deduced. In the following, these eleven criteria which, are own developments based on Hill's statements, will be outlined and the way they can lead to externalities described[14]:

(a)(i) The first of the resource-transferring externalities is liquidity provided by the Chinese MNE. This firm-level action can influence the host country's economy on a number of levels by triggering economic growth as well as by preventing lay-offs due to insolvency. The term "liquidity insurance" in this context describes all positive effects of the security that a bankruptcy becomes less likely.

(a)(ii) Technological input for the purpose of this analysis means the spill over of process and/or product technologies from the investing Chinese MNE to the German target company. It should not be confused with technology transfer in the opposite direction. If the direct investor introduces improved technologies previously not available to the target company, e.g. productivity improvements can improve its profitability and thereby overall country-level economic growth.

(a)(iii) Managerial skill externalities occur in case the Chinese MNE equips the German management with new operational or strategic instruments that help to optimise numerous facets of the target company. In turn, these optimisations will help to fuel the business performance and thereby economic growth.

(b)(i) Job creation directly in the German target company itself represents the first externality from the employment-affecting category. Through an investment in human resources the direct investor generates new jobs in the target company and thereby lowers the unemployment rate in the host economy.

[14] It should be noted that the eleven criteria can be considered to be this thesis' enhancement of Hill's previously described HCEs.

(b)(i) A type of negative externality occurs if the investing Chinese MNE lays off employees or completely shuts down plants of a target company, an action that will then negatively impact the host economy through a rise in unemployment and economic deflation.

(b)(iii) Job creation in the value chain refers to new jobs that are gained not in the target company itself, but by the direct investor's stimulation of another nature (e.g. capital or new technologies) within it, which e.g. increases demand of raw materials from a supplying company that hires new employees to cope with it.

(b)(iv) The fourth type of externality from this category is a mixture of the above-described employment-affecting ones. It occurs when the direct investor initially lays off some employees in order to improve profitability of the target company and subsequently creates new jobs as soon as the optimised business gains momentum.

(c)(i) An improvement of the host country's BOP can be achieved through export stimulation if the companies involved in the FDI transaction create synergies with the help of joint exploitation of their sales networks, i.e. the German company gains access to its Chinese mother's distribution network and customer base in Asia (and vice versa) and can thus increase its export volume.

(d)(i) The entire host economy benefits from a direct investor that invests in R&D activities of the German target company due to the stimulator of competition it acts as. It will foster the availability of innovations on a country-level scale.

(d)(ii) If the innovations created by the R&D efforts described in the point above prevail throughout the respective sector of the German economy, this particular sector will experience an increase in productivity that acts as a multiplier of the initial investment by the Chinese MNE in its German target company.

(d)(iii) This externality is also directly connected to the last two points and describes an economy welfare gain caused by a lowering of prices in the respective sector which, in turn, had improved in productivity due to the Chinese MNE's initial OFDI transaction.

Table 1 introduces 35 examples of German companies which were acquired by Chinese MNEs in the past. All of the transactions have been examined for the types of HCE brought forward by Hill in the earlier.

	Chinese OFDI investor	German target company	(a) Resource-transferring			(b) Employment-affecting				(c) BoP-affecting	(d) Competition and economic growth-effects		
			(i) Liquidity insurance	(ii) Technology input	(iii) Managerial skills	(i) Direct job creation	(ii) Direct lay-offs	(iii) Job creation in value chain	(iv) Initial lay-offs, then creation	(i) BOP improvement through export stimulation	(i) R&D/innovation accelaration through increased competition	(ii) Productivity gains in sector	(iii) Lower prices in sector
1	ASM Pacific Technology Inc.	ASM Assembly Systems GmbH & Co. KG (formerly Siplace)	X	X	X					X	X	X	X
2	AVIC Electromechanical Systems Co., Ltd.	Koki Technik Transmission Systems GmbH								X	X		
3	Hisense Co., Ltd.	Loewe Technologies	X		X				X	X	X		X
4	Sany Germany GmbH	Putzmeister Holding GmbH	X							X	X		
5	Shanggong (Europe) Holding Corporation GmbH	Dürkopp Adler AG	X			X				X	X		
6	Wuhan Iron and Steel Co Ltd (WISCO)	Wisco Tailored Blanks GmbH (formerly ThyssenKrupp Tailored Blanks)	X			X					X	X	X
7	Lingyun Industrial Corporation	Kiekert AG								X	X		
8	CITIC Dicastal	KSM Castings Group				X		X		X		X	
9	Shanghai Sailstar Machinery Group	BÖWE Textile Cleaning GmbH	X				X						
10	Shenyang Machine Tool Group	Schiess GmbH	X			X				X	X	X	
11	Dalian Machine Tool Group	F. Zimmermann GmbH	X										
12	Qingdao Hisun Garments Group	GITEC GmbH	X				X						
13	Be jing No.1 Machine Tool Plant	Waldrich Coburg GmbH (formerly Adolf Waldrich Coburg GmbH & Co. KG)	X		X	X				X	X	X	X
14	Harbin Measuring & Cutting Tool Group	Kelch & Links GmbH	X							X			
15	Weichai Power Co., Ltd.	Kion Group GmbH	X							X	X		
16	Sanhua Group	Sanhua AWECO Appliance Systems GmbH (formerly Aweco GmbH)	X				X						

			(a) Resource-transferring			(b) Employment-affecting				(c) BoP-affecting	(d) Competition and economic growth-effects		
			(i)	(ii)	(iii)	(i)	(ii)	(iii)	(iv)	(i)	(i)	(ii)	(iii)
17	Hytera Communications Co. Ltd.	Rohde & Schwarz Professional Mobile Radio GmbH	X			X				X	X		
18	Ningbo Huaxiang Electronic Co., Ltd.	Sellner Gruppe	X			X					X		
19	ASM Pacific Technology Inc.	ASM Assembly Systems GmbH & Co. KG (formlery Siplace)	X			X				X	X		
20	Joyson Automotive Electronic	Preh GmbH	X							X	X		
21	Neusoft Europe AG	Neusoft Technology Solutions GmbH (formerly Harman Becker Automotive Systems GmbH)	X			X					X		
22	TCL	Schneider Technologies	X				X						
23	Lenovo	Medion AG	X			X		X			X	X	X
24	AVIC International Holding Corp	KHD Humboldt Wedag International AG	X							X		X	X
25	Li & Fung Ltd.	Miles Fashion Group	X									X	X
26	Huapeng Trading GmbH	Welz Gas Cylinder GmbH	X	X									
27	A.S. Watson & Co.	Rossmann GmbH				X		X			X	X	X
28	LinkGlobal Logistics Group	Baltic Airport Mecklenburg GmbH	X			X		X		X			
29	Chonqing Light Industry & Textile Co., Ltd.	SaarGummi Deutschland GmbH	X	X		X				X	X	X	
30	Hanergy Group	Solibro GmbH								X	X		
31	China National Building Materials Group Corporation	SINOI GmbH (formerly NOI-Rotortechnik GmbH)	X							X			
32	Shanghai Electric Group Company	Wohlenberg Werkzeugmaschinen GmbH	X		X					X	X		
33	Advanced Technology & Materials Co., Ltd.	Odersun AG					X			X			
34	LDK Solar Corporation Ltd.	Sunways AG					X						
35	Suntech Power	KSL Kuttler GmbH	X						X				
	Frequency of occurence:		**80.0%**	**8.6%**	**11.4%**	**37.1%**	**17.1%**	**11.4%**	**5.7%**	**60.0%**	**57.1%**	**28.6%**	**22.9%**

Table 1: Host country externalities from Chinese OFDI in Germany *(own table based on own research; Brück, 2014; Business-on.de, 2013; Dürkopp Adler, 2016; EPP, 2010; Gaetzner, 2014, 2015; Hill, 2009, pp. 257-260; Hofmann, 2015; Jahn, 2014; Klötzel et al., 2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g, 2012h, 2012i, 2012j, 2012k, 2012l, 2012m, 2012n, 2012o, 2012p, 2012q, 2012r, 2012s, 2012t, 2012u, 2012v, 2012w, 2012x, 2012y, 2012z, 2012aa, 2012bb; Kosmetiknachrichten, 2016; KunststoffWeb, 2013; Manow, 2004; Müncher, 2014; Neusoft, 2010; Pankow, 2014; PresseBox, 2016; Presseportal, 2016; Schroder, 2016; Spiegel Online, 2011)*

The data utilised in this analysis is collected by a literature and internet research based upon the study “China investiert” by Klötzel et al. which has a focus on patenting activity by Chinese MNEs that have conducted OFDI in Germany (Klötzel et al., 2012cc). For the purposes of this thesis it was prepared in a way that makes it possible to identify HCEs, the relative frequency of occurrence of which is displayed in the last row of table 1.

It is found that the most commonly observed externality is liquidity insurance (a)(i) which occurred in 80% of all cases. This clearly supports the notion that Chinese direct investors are oftentimes invest in German companies that have underperformed until they are on the verge of insolvency and lack the capital needed to keep pace with today’s global economy (Klötzel et al., 2012e). In other cases the German company is already owned by an MNE but is being disposed of so that a new investor must be found to take over the parental duties (Hofmann, 2015). The reason for the selection of Chinese direct investors i.a. is that other European enterprises are often close competitors, and American ones are not as focused on international expansion strategies (ibid.).

The second-most frequent externality observed at 60% of all cases is a BOP improvement of the host country through an increase in exports (c)(i). Most acquired German target companies hope to gain easier access to China and other Asian economies in order to increase their potential customer base. For example, in an interview Kion’s CEO Gordon Riske supported this observation by pointing out that his company’s Chinese stakeholder is a financially strong investor that energetically supports Kion’s important Chinese market activities (Gaetzner, 2016).

Almost as often as the previous externality (57.1%) occurs an investment in R&D in the target company (d)(i) which entails an acceleration in innovation. Subsequently, this will increase its competitiveness and the overall competition in the respective industry sector is stimulated, too. It can be deduced that Chinese investors in the majority of cases invest in R&D in their German subsidiaries reflecting their strategic long-term commitment which is rooted in their desire to gain access to the German and European markets (EPP, 2010). The Chinese investors know about the strengths of their German subsidiaries since it was found earlier that a major reason for them to acquire German companies in the first place is to gain access to their technologies and know-how. However, it is often the case that the Chinese investor acts a trigger

of innovation acceleration due to the financial power they possess. Correspondingly, in only 8.6% of all cases did the Chinese MNE transfer process or product technologies (a)(ii) to the target company which shows that the technology gap between the transaction partners is almost always in favour of the German firm. The same holds true for the transfer of managerial skills (a)(iii) that is observed in only 11.4% of all cases because mostly the Chinese investor acknowledges the German managerial skills by leaving the existing management in place (Müncher, 2014). The abovementioned R&D expenditures translate into spill over effects for the entire industry sector (d)(ii) in a considerably smaller amount of cases at 28.6%. This is likely to be due to the companies' desire to keep achieved innovations in-house for a certain amount of time. In even less cases (22.9%) do these initial R&D expenditures lead to overall lower prices in the sector (d)(iii) which were caused by the productivity gains from those investments.

For 37.1% of all cases a direct creation of jobs (b)(i) can be reported. More important than this percentage itself is the fact that direct lay-offs (b)(ii) occurred in only 17.1% of all cases. This means that in the majority of cases the Chinese direct investor did not decrease the size of the workforce which is in correspondence to the often observed contractual medium- to long-term commitments to employees and/or sites[15].

As can be deduced from these findings, the German economy benefits from Chinese OFDI mainly through an increased liquidity level of the pertaining German firms which in a considerable number of cases were even saved from the brink of insolvency by the Chinese capital injections (Schlandt, 2012). The ability to invest into the companies' competitive advantages has consequently led to increasing output in the majority of the observed cases. This is mainly due to the newly acquired access to the Chinese market that enlarged the customer bases of the German target companies thereby improving their order situations. At the same time, the additional liquidity enables German companies to enlarge their R&D budgets which in turn increases their product and process innovation power.

An important factor for the creation of HCEs is found to be the competitive relationship between the Chinese investor and its German target company. If their products are

[15] E.g. upon acquisition of the German concrete pump manufacturer Putzmeister in 2012, the Chinese direct investor Sany guaranteed to maintain all existing jobs and sites until the year 2020 (Neuhaus, 2016).

in direct competition the danger of a time-limited commitment on behalf of the investor is high and substantial externalities cannot be expected from such a transaction. On the other hand, if the direct investor considers the OFDI transaction as a strategic expansion measure into a new business field, the potential synergies are found to fuel strong HCEs (EPP, 2010).

A variety of measures that can be utilised to measure HCE were introduced in this section. It was found which of them occur most frequently in Sino-German OFDI transactions (table 1) and based on these results chapter 4.1.3.1 will identify those HCE measures most useful for the intentions of this thesis.

3.2 Absorptive capacity of host country companies

3.2.1 Concept of absorptive capacity

The concept of absorptive capacity (AC) was first introduced by Cohen and Levinthal in the late 1980s when they argued that R&D activities not only had an information-generating function, but additionally a learning function for the conducting company (Cohen & Levinthal, 1989, p. 569). Focusing on this second function of R&D they thus defined AC as a company's "ability to identify, assimilate, and exploit knowledge from the environment" (ibid.) and acknowledged that it is a by-product of a company's own R&D efforts (Cohen & Levinthal, 1990, p. 129). In broad terms, there are two distinguishable dimensions with respect to the skills that constitute the AC of a company: firstly "the capability to search and acquire new, external information about technological trends" and secondly "the capability to adapt to internal processes and resource configurations in such a way that their competitive potential is fully exploited" (Som et al., 2013, p. 5). Thus, in theory an improved handling and absorption of external information inflows can lead to the creation of competitive advantages (ibid.).

A reconceptualisation by Zahra and George (2002, pp. 189-190) provides a processual understanding of AC and makes it easier to grasp with the introduction of four distinct components:

(i) acquisition,
(ii) assimilation,
(iii) transformation, and
(iv) exploitation.

(i) Acquisition of external knowledge can only be achieved by a company that is able to identify it. This first step in AC creation can be improved by optimising its three

constituting factors: intensity, speed, and direction. While intensity and speed refer to the importance of resources raised and their efficient utilisation to create AC, direction means that an enterprise must possess expertise in different fields in order to recognise relevant external knowledge in them (ibid.).

(ii) The next step in the AC process is assimilation, which means a company's ability to fully comprehend, process and interpret the external information. Comprehension is often made difficult due to the context-relatedness of the information which is often impossible to replicate by the firm. Nonetheless, the assimilation of knowledge is one of the key aspects to successfully create AC since it represents the learning effect of dealing with external inputs (ibid.).

(iii) The transformation process involves the combination of internal knowledge the company already possesses with the now acquired and assimilated external knowledge. Zahra and George describe it as "the ability of firms to recognize two apparently incongruous sets of information and then combine them to arrive at a new schema". Such transformation of external knowledge requires an entrepreneurial mindset is at the core of how AC is created and can entail far-reaching strategic changes to the conducting company's self-perception as well as perception of its competitive environment (ibid.).

(iv) Finally in the exploitation phase, the company utilises the acquired, assimilated and transformed external knowledge to extend, optimise and/or leverage previously existent processes, or to integrate newly developed ones based on it. As a result of such systemic exploitation capabilities, companies can create AC which helps them to gain competitive advantages regarding "new goods, systems, processes, knowledge, or new organizational forms" (Zahra & George, 2002, pp. 189-190).

The first two process steps (acquisition and assimilation) can be summarised under the term "potential AC", describing the capabilities a company has in valuing and conceiving external information. Consequently, the term "realised AC" delineates the last two process steps (transformation and exploitation) by allotting them with the notion of how efficiently it handles external information once it has been made available in-house and must be leveraged and implemented (ibid.). The concept of AC is applicable at the individual firm-, industry-, and nation-levels all of which are highly intercorrelated because the AC of a country represents the sum of each of the accumulated ACs of the companies within its borders (Cohen & Levinthal, 1990, p.

128; Schmidt, 2009, p. 1; Fu, 2007, p. 8). This thesis will focus on the concept of AC on the company-level.

Measuring AC is a task that is difficult (Becker & Peters, 2000, p. 11) and hard to grasp due to the fact that companies usually do not keep records on their learning curves in the context of R&D (Schmidt, 2009, p. 1). Popular proxies to circumvent this issue that are used by many authors are surveys measuring the respective budgets, stocks and/or intensities of R&D as well as organisational structures, practices and management via questionnaires, interviews etc. (ibid.). Possible examples of such measures can include the R&D expenditure as disclosed in a company's annual report and the amount of patent registrations per year (Toole et al., 2014, p. 4).

As the definition of AC in the beginning of this chapter suggested, the most frequently used instrument to create a statistical way able to capture it is to focus on the R&D activity of companies. However, this implies an increased level of difficulty when it comes to measuring the AC of companies which do not spend a large part of their revenue on R&D activities in order to keep an edge over their competitors, but e.g. focus on providing incremental customer-specific product or process innovations (so-called "non-R&D-intensive companies") (Som et al., 2013, p. 11). These companies will not launch a significant number of innovative new products into the market or invent newly patented process innovations, but will display their AC in other ways. For example, their AC would rather be measured by more indirect means such as an evaluation of the efficiency of their external information utilisation processes that help to translate randomly incoming information into actual performance improvements.

3.2.2 Absorptive capacity of IFDI target companies in Germany

The previous chapter explained the mainstream concept of AC through a technology gap between the home country and the host country companies. Chinese companies that have received German IFDI strongly focus on absorbing the superior technologies of their investors which is reflected in the fact that they develop much faster in terms of R&D activity and innovation power than their fully domestic competitors (Fu, 2007, p. 11). However, this notion has obvious limitations in the context of FDI from developing to developed economies since it is rarely the case that the host country company is inferior in technological progress to its foreign direct investor. Especially in the case of Chinese investors in Germany a reconsideration of

AC is inevitable due to this “reversed technology gap” that exists between the two transaction parties.

It was found in chapter 2.6.2 that Chinese investors specifically seek out German companies as targets for their strong local R&D capabilities. The inverse conclusion is that they do not intend to introduce any of their developed technologies but back their expansion strategies on those of their target company. They endow it with a high level of liquidity and leave the realisation of R&D achievements to the experienced German employees. In other words, the Chinese investor can be recognised as a framework-builder in which the German target company is able to capitalise best upon what the Chinese understand to be its core competency: developing innovative and competitive solutions. This not only explains the long-term orientation of Chinese OFDI, but also that in most transactions none or only a single Chinese manager replaces German managers because it aims at pertaining the established German business model with its strong “Made in Germany” brand perception (Pfoertsch & Liu, 2011, p. 80). The way AC was defined in the previous chapter cannot explain such behaviour, since new technologies and processes are being absorbed by the investing rather than the target company. Earlier it was established that OFDI flows from China to Germany are a very recent phenomenon when compared to the mainstream definition of OFDI from developed to developing countries. This is the reason why there is hardly any literature on AC attempting to reconceptualise it in a way that makes it a better fit to the reverse case. This is the starting point for this thesis to redefine AC for its purposes.

One solution to this issue would be to redefine AC as a skill of the direct foreign investor in cases of OFDI from developing to developed countries. However, this would not be in accordance with the aims of this thesis because it analyses host country effects of IFDI flows and thus is inseparably linked to the AC of host country companies. Therefore, instruments must be found for the measurement of AC in German companies based upon the commodity introduced by the Chinese direct investor. As was found earlier, in the majority of cases this commodity is not technological innovation, but increased liquidity which enables investments in R&D as well as access to and support in the Chinese market. AC in this sense is thus deals with capturing how well a company can utilise the provided liquidity to expand its business activities through the investment in R&D activities which lead to highly competitive products and/or processes. Like with the “traditional” concept, for this

reconceptualised version of AC proxies that are able to reflect this business expansion in order to measure its success or failure over time, can be used. However, it is important that they consider not only purely innovation-based variables but additionally business expansion- and efficiency-related ones. Taking the above into consideration, chapter 4.1.3.2 will develop AC measures suitable for the purposes of this thesis.

4 Success prediction of Chinese OFDI in Germany: an empirical analysis and development of a statistical model

4.1 Design of empirical analysis

4.1.1 General design and statistical model development

The main intention of this thesis, as set out in chapter 1.1, is the development of a statistical model which has the ability to on the one hand identify success-influencing characteristics, and on the other hand predict the probability of success of a potential Chinese direct investment in a German company. The prediction is to be based on the experiences made with past transactions of the same kind. The success of transactions will be measured with the help of different host country externalities such as the development of sales numbers. In order to being able to determine a positive or negative development, these numbers are recorded for a period of four consecutive years, beginning with the year of the acquisition. This way, the immediate impact of Chinese investors on German companies becomes measurable. To determine which companies develop well under Chinese ownership, they are classified with the help of their general characteristics (e.g. industry or location) on the one hand, and their absorptive capacities on the other hand. For the AC two measures will be developed based on a company's R&D efforts (e.g. patent applications) and fixed assets (F/A) utilisation (e.g. F/A turnover ratio). Based upon these different elements, as a final result a user interface in the form of dashboard will be created which can calculate the most probable outcome of a new target company's acquisition. The output of this dashboard will be a categorised score, i.e. a recommendation which can range between a limited number of characteristics.

Due to the abovementioned requirements, the success-measuring dependent variable must be transformed into an ordinal, categorical variable. Also the independent predicting variables, as will be further discussed later, are processed in a way that they are either of an ordinal or nominal measurement level. This rules out a prediction with the help of a multiple regression analysis since it cannot perform

well without scale variables (Roni, 2014, p. 61) and with a relatively small sample size (Schneider et al., 2010, p. 781). Additionally, a tool with dedicated prediction capabilities shall be favoured. More specifically, these prerequisites narrow down the possibly applicable statistical models to the following two: linear discriminant analysis (LDA), and logistic regression (LR) (Pohar et al., 2004, pp. 143-144).

Basically, both tools can be used interchangeably as a classification instrument which sorts cases into different groups backed by a multiplicity of independent variables (Green & Salkind, 2005, p. 309). Tabachnick and Fidell point out that LDA is frequently used when the independent variables are continuous and characterised by a normal distribution whereas LR is preferred in case they "are a mix of continuous and discrete and/or poorly distributed" ones (Tabachnick & Fidell, 2007, p. 23). LR is a very flexible tool since it makes no assumptions with respect to the distributions of the independent variables of the analysis and is therefore applicable in a wider range of circumstances (Pohar et al., 2004, p. 144). However, problems can arise when the amount of predicting independent variables is too high in relation to the amount of cases in the dataset leading to decreased discrimination power between the groups (Tabachnick & Fidell, 2007, p. 442). LDA on the other hand is suitable for smaller sample sizes if the condition that the number of independent variables remains smaller than the number of cases in the smallest group is met (Tabachnick & Fidell, 2007, p. 381). Under otherwise equal conditions, LDA achieves better prediction accuracy rates than LR, as long as the assumptions required by LDA, which will be further explained below, are met (Pohar et al., 2004, pp. 149-150). Additionally, LDA is described in the literature as an instrument specifically powerful for the purpose of class prediction, and if such a prediction is the dedicated purpose of an LDA, its classification accuracy to a certain extent overrules its required assumptions in terms of prioritisation (Tabachnick & Fidell, 2007, p. 381). Consequently and for the purposes of this thesis, an LDA offers the best statistical framework regarding the development of a model which predicts the success prospects of future Sino-German OFDI transactions.

LDA discriminates between the groups of a dependent variable by measuring the distances between these groups' respective means, also called "group centroids", which should be as far away from each other as possible in order for the classification to be reliable (StatSoft, 2000). Within the groups on the other hand, the overall means should be as close together as possible, i.e. be characterised by low variance (ibid.).

There are two basic statistical purposes LDA can serve which are the analysis and interpretation of differences between groups, and the classification of cases into groups based upon the discriminant rules (Klecka, 1982, pp. 8-9). This thesis is focusing on the latter field of application which combines "the group characteristics in a way that will allow one to identify the group which a case most closely resembles" (ibid.). Naturally, the second part of the analysis cannot be performed without the first one since in order to classify cases, discriminant functions which separate between the groups must be established. Establishing the rules of classification into the possible values of the dependent variable (also known as response variable) is done in the first part with the help of discriminant function analysis. The discriminant function provides a new variable named the "discriminant function score" (D) which displays the predicted group membership based on the constant (b_0), the independent variables' values (x_j) (also known as predictor variables), and their respective discriminant coefficients (b_j). This results in the following general form of the discriminant function:

$$D = b_0 + b_1 \times x_1 + b_2 \times x_2 + \cdots + b_j \times x_j$$

If LDA is used for the discrimination between only two groups of the dependent variable (g), one discriminant function is sufficient. However, for classification into more than two groups the maximum amount of required discriminant functions equals g-1 or the number of independent variables, whichever is smaller. The reason for this is that while the first function has the task of maximising "the difference between the values of the dependent variable", the following functions maximise the difference between the values of the dependent variable under consideration of the respective previous function (Bian, 2012, pp. 7-8). Usually, the first function of such a "multiple LDA" will have the highest discriminatory power whereas the following ones can add additional differentiation dimensions (ibid.). In terms of variance, the first function will explain the largest amount, the second will explain the largest amount of the remaining unexplained amount and so on (Poulsen & French, 2008, p. 2). The resulting discriminant function score is used in the second part of LDA for computing the predicted group membership of newly added cases based upon the discriminant rules established in the first part.

Before the LDA can be carried out, the underlying assumptions linked to it must be met. The first assumption concerns the samples of the independent variables which

should be characterised by normal distribution (Tabachnick & Fidell, 2007, p. 382). A non-normal distribution is only negatively affecting the analysis in case it roots in the existence of outliers, while skewness-induced non-normality does not reduce its discriminant power (ibid.). The second assumption states that no outliers must exist within each group of the dependent variables because they will adversely impact on the significance of LDA (Poulsen & French, 2008, p. 3). The third assumption states that for each group of the dependent variable the population variance-covariance matrices should be homogeneous (known as “homoscedasticity”) or else LDA will yield unreliable results (Klecka, 1982, p. 9). Lastly, the fourth assumption concerns the independence of independent variables among each other. An existing dependence of such a kind between independent variables (known as “multicollinearity”) will lead to decreased predictive power of the model (Poulsen & French, 2008, p. 3).

As a next step, the general design of the proposed model shall be drafted and in order to provide a better understanding of it, figure 2 presents a schematic overview of its design:

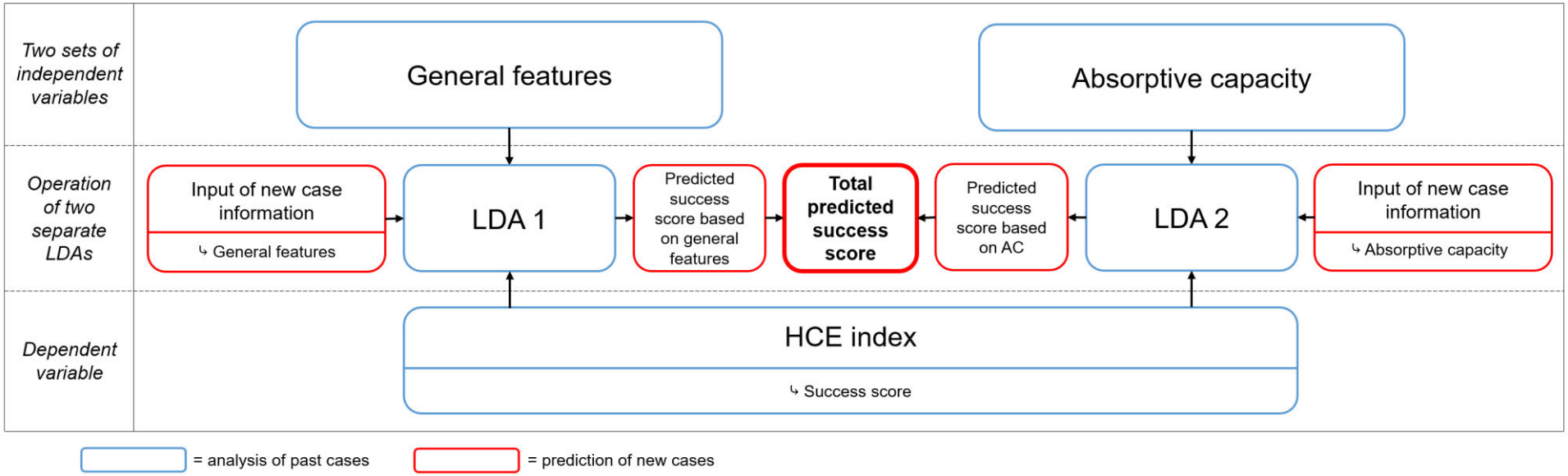


Figure 2: Design of statistical success-predicting model *(own figure based on own research)*

The model is designed in a way that each step resembles one box and the connecting arrows display the order of operation. It is split into three rows and the middle one contains all steps related to the actual conduction of the proposed LDA. The top and bottom rows on the other hand display the data required for it, i.e. the independent and dependent variables. All steps that are based upon past case data are coloured blue while all steps associated with the success prediction of new cases are coloured red. The blue steps constitute the analysis-focused first stage of LDA, whereas the red ones refer to the second stage of LDA, i.e. classification of new cases.

As can be concluded from the table, two separate LDAs will be performed, one using the independent variable “general features”, and the other one using the independent variable “absorptive capacity”. Both will be introduced in detail in chapter 4.1.3.2. These are used to predict the dependent variable “HCE index” which represents the success measure for this analysis and the composition of which is discussed separately in chapter 4.1.3.1. The HCE index is used for both LDAs in equal form so that they only differ in the independent variable used. As a next step, the independent and dependent variables are united when the LDAs are conducted and the past OFDI cases are classified according to their success score as defined by the HCE index.

From that point onwards the analysis progresses to the second stage and information of potential future transactions regarding the general features and absorptive capacity is used as a basis to predict their respective score in terms of the HCE index. As a last step, the two separate success scores are being combined to predict total success of the OFDI transaction. The LDAs themselves will be carried out using the statistics software IBM SPSS19 and its discriminant analysis functionality.

4.1.2 Dataset and sources

Before further progressing with the analysis, the utilised dataset shall be introduced[16]. As stated earlier, a quantitative approach is utilised by this thesis rather than a qualitative one. As opposed to most studies that apply qualitative surveys as proxies in order to circumvent the difficulties in quantifiability of HCE and AC measures, this approach offers new insights. The motivation behind the abandonment of a qualitative survey approach is the desire to be independent from possible inaccuracy, incomparability and incompleteness of data. Additionally, since this thesis’ aim is to

[16] For a better overview, a complete version of the dataset can be found in appendix A.1-A.5.

provide a statistical way of predicting success, its foundation must be numerically plausible and traceable.

For the purposes of this thesis, the first step in obtaining a relevant dataset is to define which information is necessary for each case in order to be valid. This requirement can be deduced from figure 2 in the previous chapter which introduced all elements that are fed into the analysis. To provide a total overview of the ten variables, table 2 displays all of them including additional specifications.

	Variable type	Information type	Variable	Source	Time dimension
a1	Dependent	HCE index	Sales	UR	period
a2			F/A	UR	period
a3			Employees	UR	period
b1	Independent	General features (LDA1)	Initial stake	UR	point
b2			Industry	UR	point
b3			Region	UR	point
b4			Ownership structure	UR	point
b5			Size	UR	point
c1		Absorptive capacity (LDA2)	AC1 (patents)	DPMA	period
c2			AC2 (depreciation)	UR	period

Table 2: Data specifications and sources *(own table based on UR, 2017; DPMA, 2017; own research)*

For the proposed analysis of the HCE index (a1-a3) sales, F/A, and employee figures of German companies that were acquired by Chinese investors must be collected. The online database of the official German business register "Unternehmensregister" (UR) which is run by order of the German Federal Ministry of Justice and Consumer Protection, offers access to the annual reports and/or financial statements (depending on their legal form) of all companies registered in Germany (UR, 2017). These documents are uniform in terms of their layout as well as content so that they present a reliable source for a wide variety of company figures including those required for the HCE index. This index is a success measure and therefore a simple reference to a single point in time cannot capture a positive or negative development of it. Instead of using a single figure, four consecutive annual ones are obtained for each of the variables. The first value always corresponds to the year in which the Chinese acquisition took place and the three[17] subsequent ones capturing the

[17] Due to the fact that the UR publishes companies' annual reports of any given year only in November of the following year, data for 2016 was not yet available before the date of submission of this thesis. Thus, for acquisitions that occurred in 2013, only three instead of four years could be utilised to retrieve values. The success score for these cases is based on the average development of three instead of

development of the HCE index in its aftermath. The positive or negative development is then measured on the basis of the percentage difference between each of the years, and consequently on the average value of each of these percentages, so that for each case a single average success development measure is created.

Moreover, also the five characteristics of the general features independent variable (b1-b5) can be sourced from the same documents retrieved from the UR's portal since the reports and statements collected there provide all general information on the respective companies. In terms of measurement, these five variables are static over short to medium periods of time which makes it unnecessary to capture an average development as with variables a1-a3.

The second set of independent variables includes two different measures of AC. Both AC measures c1 and c2 are partially based upon figures already obtained for the previous variables so that only the number of patent applications and depreciations on F/A remain to be collected. While the latter is disclosed in the already compiled reports published by the UR, information on patents is based on data from the official German patent office "Deutsches Patent- und Markenamt" (DPMA) offering reliable and comparable publications on patent applications[18] by companies registered in Germany (DPMA, 2017). Like with variables a1-a3, c1 and c2 cannot be captured on a point in time-basis and are therefore measured as an average change over a period of four years starting in the year of the acquisition.

Only if all seven variables a1-c2 can be retrieved from the described sources, a case is considered to be complete and suitable for further analysis. The combination of a company's annual reports as well as its valid DPMA entry make its case valid which secures the integrity and reliability of the dataset. In the end, 35 individual valid cases of Chinese OFDI in Germany could be collected from the described sources. This number is suitable for the proposed LDAs which will incorporate five and two predictor variables respectively, since the recommended minimum amount of cases should exceed the number of predictors by the fourfold (Poulsen & French, 2008, p. 3).

four values. It was decided to accept this trade-off for the obtainment of very recent data. Cases more recent than 2013 were omitted from the dataset due to significance issues of a success measure only based upon the difference between two years.

[18] For the purposes of this paper, under the term "patent" not only patent applications but also utility model applications are included because they reflect underlying R&D efforts as well.

4.1.3 Components of the linear discriminant analysis

4.1.3.1 Dependent variable: host country externality-based success measures

After the statistical framework, within which the proposed analysis shall be conducted, as well as the dataset have been set up, a suitable success measure that will then be used as the dependent variable in the two LDAs, as presented in figure 2, must be developed. Based on this dependent variable a success score shall be derived which indicates how well a given OFDI transaction has performed based either on its case-specific general features or absorptive capacity.

The success measure provides information on performance in terms of the level to which the direct investment has created HCEs in the German economy. Chapter 3.1.2 analysed a number of different HCEs for their relevance when it comes to Sino-German investments and the three most important ones (a1-a3 in correspondence to the earlier introduced nomenclature) shall be merged to create an index that unites the information of three separate key figures in one. This index is called “HCE index” and consists of three different measures:

a1 F/A,
a2 sales, and
a3 number of employees.

a1: The first HCE added to the index is the BOP improvement through export stimulation which is triggered by a German target company’s ability to sell its products in the China with its many potential customers. Consequently, the affiliation with the Chinese parent company reduces the obstacles that must be overcome to enter the Chinese market significantly. This development is quantified with the help of the sales figures of the German companies. Included in these are the sales made to overseas locations such as China and if the figure improves after the acquisition through a Chinese investor, this suggests an increase in exports which positively affects Germany’s BOP and vice versa.

a2: Secondly added, and according to the findings of table 1 the most frequently observed HCE, is the provision of liquidity which in turn enables the German target companies to invest in their production facilities and/or R&D activities. The measure used to empirically capture this is the value of F/As tied within the companies. This value provides information on the investments made in modern production facilities which help to maintain competitiveness. If an increase in F/As can be observed after

the entry of a Chinese investor, the inference is that the target company's liquidity increased allowing for facility investments. A decrease on the other hand infers disinvestments and the lack of long-term commitment prospects.

a3: The third index component refers to the HCE of direct job creation. It is fairly straightforward that the hiring of new employees after the acquisition indicates a positive development due to an expansion strategy of the investor. On the other hand, lay-offs directly after the transaction are an adverse sign and negatively impact the host country.

Next, these three components will be merged and processed in such a way that their information is displayed by one single score. In the previous section it was established that the variables of the HCE index are time period-based and measured as average change of up to four individual annual values. As was mentioned above, cases with a total of three values were also accepted into the dataset. Thus, for any given case with four observed values, let it be called "C_a" and its values "v_1" to "v_4", the average change during its entire observation period is calculated as follows:

$$\emptyset\Delta C_{\mathrm{a}} = \frac{\left(\frac{v_2 - v_1}{v_1}\right) + \left(\frac{v_3 - v_2}{v_2}\right) + \left(\frac{v_4 - v_3}{v_3}\right)}{3} \times 100$$

For any given case with three observed values, let it be called "C_b" and its values "v_1" to "v_3", the average change is calculated as follows:

$$\emptyset\Delta C_{\mathrm{b}} = \frac{\left(\frac{v_2 - v_1}{v_1}\right) + \left(\frac{v_3 - v_2}{v_2}\right)}{2} \times 100$$

These calculations are equal for all variables of the HCE index (a1-a3) and the next step in the normalisation process is to introduce a score-based classification approach for each of them, so that their scores can eventually be added up to form an index. The scoring range is defined to range from 0 to 20 points for each variable so that the maximum value of the HCE index amounts to 60 points. Before progressing further, any outliers and/or extreme values must be filtered out since this is a requirement to successfully perform LDAs. This is done with the help of the so-called inner fences which are based upon the interquartile range. Any cases that exhibit a value beyond these fences either score 0 points (lower inner fence) or 20 points (upper inner fence) so that they cannot distort the results anymore. It follows

that the range of non-outlier cases spans from 1 to 19 points which is depicted in table 3:

	$ØΔC_x$ (change percentage range)					
	a1 Sales		a2 F/A		a3 Employees	
Score	from	to	from	to	from	to
20 points (=upper fence)	39.40		22.90		12.15	
19 points	35.53	39.39	20.33	22.89	10.74	12.14
18 points	31.65	35.52	17.76	20.32	9.33	10.73
17 points	27.78	31.64	15.19	17.75	7.92	9.32
16 points	23.91	27.77	12.63	15.18	6.51	7.91
15 points	20.03	23.90	10.06	12.62	5.10	6.50
14 points	16.16	20.02	7.49	10.05	3.69	5.09
13 points	12.28	16.15	4.92	7.48	2.28	3.68
12 points	8.41	12.27	2.35	4.91	0.87	2.27
11 points	4.54	8.40	-0.22	2.34	-0.54	0.86
10 points	0.66	4.53	-2.78	-0.23	-1.96	-0.55
9 points	-3.21	0.65	-5.35	-2.79	-3.37	-1.97
8 points	-7.08	-3.22	-7.92	-5.36	-4.78	-3.38
7 points	-10.96	-7.09	-10.49	-7.93	-6.19	-4.79
6 points	-14.83	-10.97	-13.06	-10.50	-7.60	-6.20
5 points	-18.71	-14.84	-15.63	-13.07	-9.01	-7.61
4 points	-22.58	-18.72	-18.19	-15.64	-10.42	-9.02
3 points	-26.45	-22.59	-20.76	-18.20	-11.83	-10.43
2 points	-30.33	-26.46	-23.33	-20.77	-13.24	-11.84
1 point	-34.19	-30.34	-25.89	-23.34	-14.64	-13.25
0 points (=lower fence)	-34.20		-25.90		-14.65	

Table 3: Scoring system and outlier identification of HCE index' variables *(own table based on own calculations)*

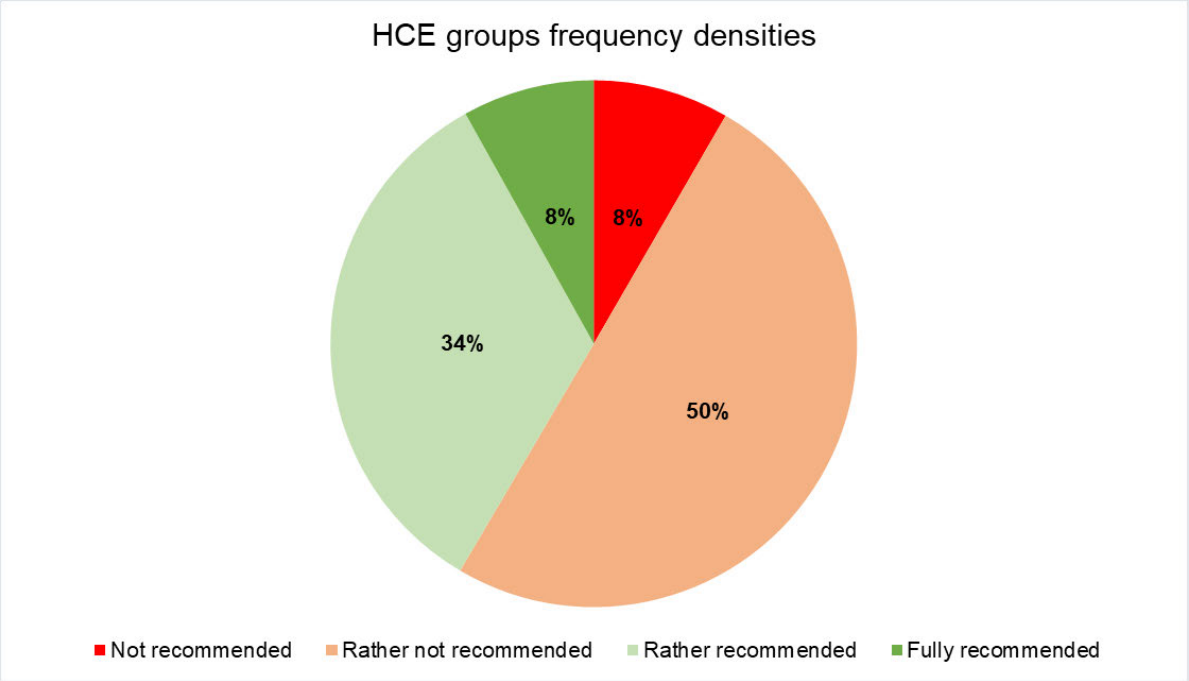
With the help of the conducted normalisation through classification all cases receive their HCE index score based upon its performance in terms of sales, F/A and employee numbers, a total list of which can be found in appendix A.6. When interpreting the score it should be kept in mind that it cannot assume negative values despite the fact that in the underlying average change data negative values occur. As becomes apparent from table 3, any HCE index of 30 or below indicates a negative development of its constituting variables. The reason for the selection of this range of scores is that the HCE index is the dependent variable in the following LDAs and will be transformed in a way that it can easily be divided into four categories which correspond to a full or partial recommendation to either conduct the OFDI transaction in question or not. The further processing is done to generate an LDA-suitable and easily comprehendible final output inspired by a traffic light colour system. This is done with the help of the introduction of four categories of equal occupation density

that are differentiated by a colour code of red, light red, light green, and green as is visualised in table 4:

	Not recommended	Rather not recommended	Rather recommended	Fully recommended
Absolute frequency	9	9	9	8
Relative frequency	26%	26%	26%	23%
Class borders	Score range 0-24	Score range 25-30	Score range 31-37	Score range 38-60
Frequency density	0.375	2.250	1.500	0.364

Table 4: Frequency table and classification of HCE index' score range *(own table based on own calculations)*

The equal occupation method ensures that no class is over- or understaffed, a circumstance that would otherwise distort this relatively small dataset size of 35 cases. This sample size thus leads to three categories containing nine cases and one category eight cases. Both the first and last classes have relatively low frequency densities of 0.375 and 0.364 which establishes that the majority of cases is grouped into the two middle categories of "rather not recommended" and "rather recommended". This is an intentional distribution since "fully recommended" and "not recommended" cases should not occur as often. This new grouped HCE index variable will be utilised as dependent variable in the later LDA models.



Graph 5: HCE groups frequency densities *(own graph based on own research)*

With respect to the preconceptions against Chinese acquisitions of German companies described in chapter 2.6.2, graph 5 visualises that in 58% of cases a

transaction receives the negative labels of “rather not recommended” or “not recommended”. However, at the same time a not insignificant amount of 42% either achieve “rather recommended” or “fully recommended” reflecting the positive experiences made with Chinese investors’ long-term commitments and expansion strategies for their German subsidiaries.

This result emphasises the need to be aware of the potential problems that can arise in Sino-German OFDI transactions, however, a general scepticism towards it must be avoided since real-world experiences show that there are many examples in which the outcome of such acquisitions was positive. The task of this thesis is to find out which variables impact the outcome in which way with the help of the two LDAs that will be conducted in the following chapters.

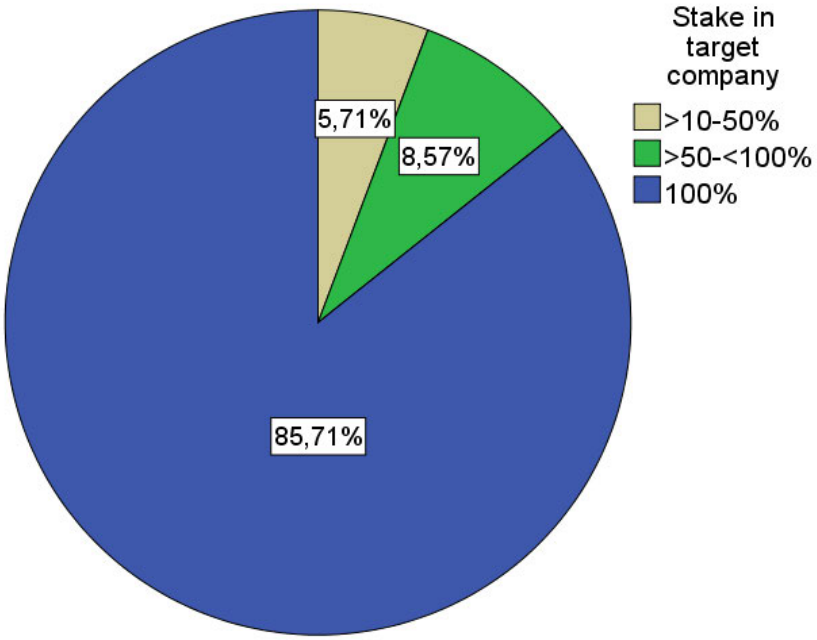
4.1.3.2 Independent variables: general features and absorptive capacity

In terms of independent variables, each LDA incorporates an individual set that will be used. The first analysis will be conducted with a selection of five general features that characterise the OFDI transactions included in the dataset which will be introduced in the next chapter. The second LDA is based upon the AC-related independent variables, referred to as AC1 and AC2, as was presented in table 2. The separation of the LDAs will allow to compare differences in the discriminant power of the predictor variables. These, in total seven, variables also make possible the descriptive analysis of the dataset that provides an overview of the differences between its transactions. Additionally, all independent variables are being transformed into ordinal or nominal measuring levels in order to better suit the requirements of LDA that were discussed earlier. This is realised with a classification-based normalisation approach which will be explained for each independent variable individually.

With regard to the five general features variables of LDA1, data on the following ones was collected for each case in the dataset:

b1 initial stake,
b2 industry,
b3 region,
b4 ownership structure, and
b5 size.

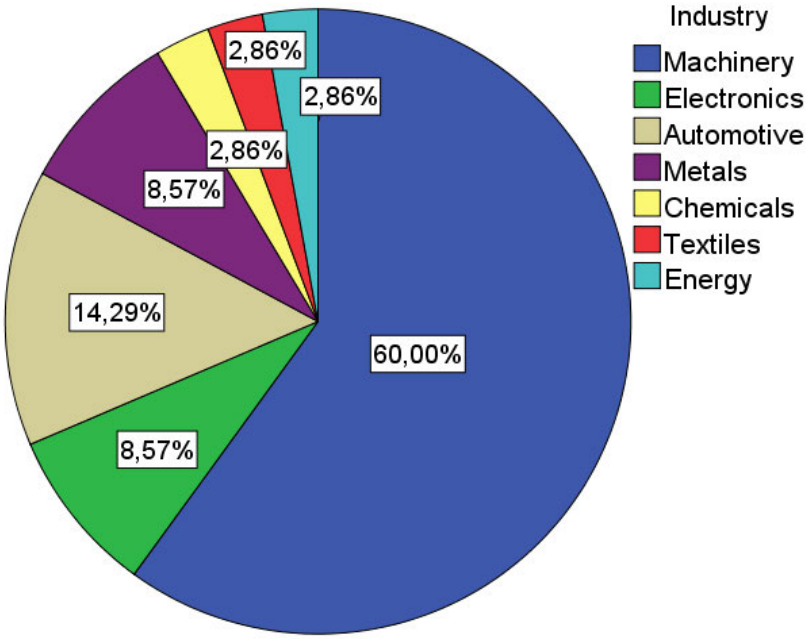
b1: The first feature measures the size of the initial stake in the German target company that the Chinese direct investor acquired in the course of the OFDI transaction. As was found earlier, the minimum requirement for a cross-border investment to qualify as FDI is the purchase of a minimum of ten percent of all assets. This is the reason why there are no cases in the blue “<=10%” category in graph 6. The purple area indicates those transactions of the dataset in which the Chinese investor acquired 100% of the German target company. As becomes obvious, at over 85% such complete acquisitions are the most common form of investment. When it comes to the classification process, the original percentages were split into four classes that are demarcated by borders significant in FDI analysis. Besides the blue “100%” category, the beige-coloured “>10-50%” class captures all cases in which the Chinese investors have become minority shareholders. If they acquired a majority of the voting rights, they will be classified in the green-coloured “>50-<100%” class. The “<=10%” category has been omitted since these cases do not qualify as FDI. The result of this classification is an ordinal independent variable with three categories.



Graph 6: Independent variable b1: stake in target company *(own graph based on own research)*

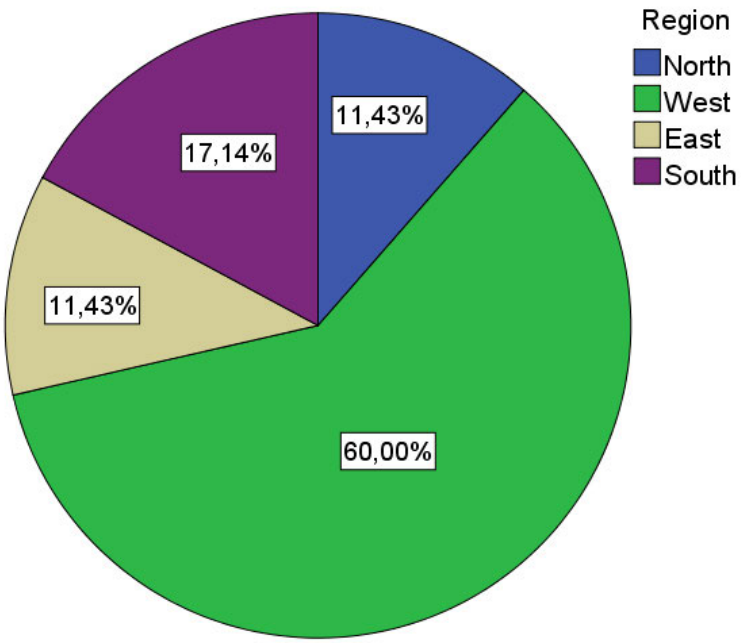
b2: The second general feature variable distinguishes between seven industry sectors to which the German companies belong. Graph 7 clearly indicates that within this dataset investors from China in the majority of cases (60%) are interested in companies from the machine building industry. The second-most common industry is automotive (ca. 14%) which consists primarily of suppliers to automotive

manufacturers. Metal- and chemical-producing industries both reach a percentage of ca. 9% and confirm the impression that Chinese investors almost exclusively seek out manufacturing companies as target companies. The original data of this variable already had a nominal measurement level and the number of categories resembles the seven occurring industries within the dataset.



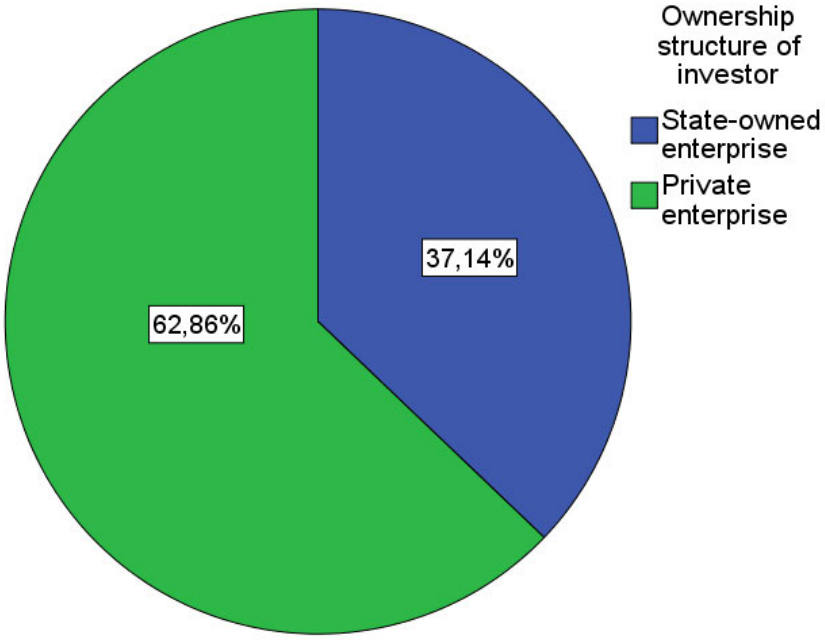
Graph 7: Independent variable b2: industry *(own graph based on own research)*

b3: In terms of geographical dispersion, the according variable points out that 60% of all target companies are located in the Western region of Germany while the South accounts for ca. 17% of cases and the Northern and Eastern regions for only about 11% each, as can be seen in graph 8. This finding is rooted in the fact that the secondary sector industries, which were identified as highly attractive to Chinese investors, are concentrated in the West and South of Germany (GfK Geomarketing, 2011). This variable is coded nominally with four possible values representing the main regions of Germany that occur in the dataset.



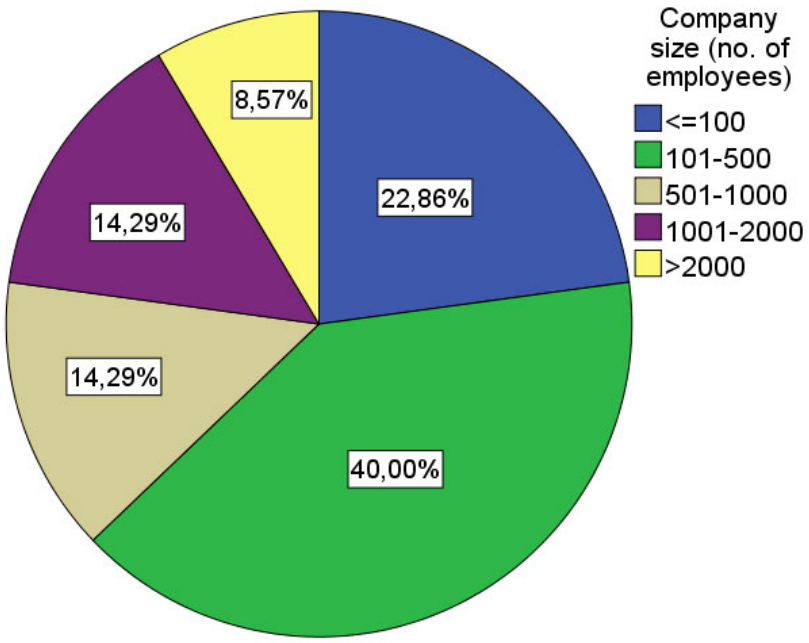
Graph 8: Independent variable b3: region *(own graph based on own research)*

b4: In terms of the Chinese investors, graph 9 indicates that the majority of them is under private ownership (ca. 63%). Nevertheless, the amount of SOEs conducting OFDI transactions still amounts to about 37% and as was mentioned before, with such companies the possibility of government-motivated acquisitions must be carefully considered. In terms of possible values this variable can only indicate two: either a private or a state-owned investor. Therefore it is a nominal variable and does not need further classification.



Graph 9: Independent variable b4: ownership structure of investor (own graph based on own research)

b5: The last independent variable discriminates between various sizes of companies measured with the help of their number of employees. As can be seen in graph 10, most companies acquired by Chinese investors are of small to medium size with firms employing 101-500 workers making up 40% of all cases, and those employing 100 or less workers about 23%. The data of this variable was originally metric and classification was used to create an ordinal one. The borders between classes were chosen in correspondence to generally common standards with regard to the definition of small-, medium-, and large-sized companies[19]. The blue "<=100" class includes all cases in which the target company is of small size, whereas the green "101-500" class contains those of medium-size. Large companies fall into the next two categories and major enterprises with more than 2000 employees belong in the yellow-coloured last class.



Graph 10: Independent variable b5: company size (no. of employees) *(own graph based on own research)*

Next, the second set of independent variables, which measures the AC of the companies in the dataset, will be defined. It was found earlier that the statistical capture of AC is an exercise disputed throughout the literature with many different approaches to circumvent the difficulties in measurement possible. The first step to spread the potential failure risk is to introduce two AC measures, rather than a single one, both of which will be used in LDA2 as predictor variables:

[19] E.g. see the definition by the "Institut für Mittelstandsforschung Bonn" (IfM Bonn, 2017).

c1 patents per employee (for AC1), and

c2 F/A turnover ratio (for AC2).

c1: AC1 is based on the earlier discussed idea, that the number of patents introduced by a company is a way of quantifying its AC because it is directly related to its R&D efforts. This argumentation is acknowledged by this thesis, however, as was established previously, the companies included in the dataset are very diverse in terms of their employee numbers. Therefore the first AC measure (AC1) is calculated in the following way:

$$AC1 = \frac{Number\ of\ patent\ applications}{Number\ of\ employees}$$

By dividing the number of patents a company applies for by its number of employees, a relative measure is created which adds comparability because the mere size of a company cannot distort its AC1 value anymore. Caused by its calculation, AC1 is a proxy that aims at quantifying the efficiency at which the existing workforce is utilised in order to create new ideas and translate them into marketable products and/or processes. If AC1 is high, it indicates an emphasis on the recruiting of creative employees, the encouragement of pursuing potential innovations, and a business model that is focused on innovation itself as well as streamlined to pick up ideas from the company's environment and translate them into revenues in the sense of the AC theory by Zahra and George that was discussed in chapter 3.2.1. As was established by table 2, AC1's data is collected on a time period basis over four years starting from the year of acquisition. The same limitation as with the earlier discussed general features variables applies, i.e. more recent than 2013 can only be calculated on a basis of three values due to the lack of data from the UR.

c2: The second AC measure (AC2) adopts a more balance sheet-based approach of measuring it. It was found above that German companies in the majority of cases receive high volumes of liquidity from their Chinese investors. This financial support is the most important commodity in the transaction from the target's point of view. Therefore, AC2 aims to review the effectiveness at which the target company absorbs this liquidity and translates it into an increase in sales through investment in its F/A, i.e. new production techniques, improved capacity etc. Its assumption is that the investment of capital in F/A alone does not constitute a successful absorption of commodities provided by the Chinese parent, but that these investments must also

increase the actual sales numbers (e.g. through an expanded customer base through access to the Chinese market). Otherwise the direct investment is in danger of being only of a short-lived nature because the capital will then just have a temporary life support function instead of a sustainable one. Under consideration of these findings, AC2 is defined as the “F/A turnover ratio” which is calculated by the following formula:

$$AC2 = \frac{Sales}{F/A - Depreciation\ on\ F/A}$$

As becomes visible, the F/A must be adjusted for depreciation effects to reflect the true value of them for a given period. If AC2 scores high, the respective target company is successful in absorbing the provided capital from its direct investor in a way that not only expands its business activities, but simultaneously improves its revenue performance. In combination, AC1 and AC2 allow the second LDA to analyse the concept of AC from two different angles thus providing a more reliable and differentiated prediction of its discriminating power.

In order to enable that AC1 and AC2 can be used in the LDA they must be transformed into ordinal variables. As table 5 displays, both AC measures are captured on a time period-basis that is equal to the variables of the HCE index. Thus, for each case four consecutive annual values are recorded beginning with the year of the acquisition. As described above, for acquisitions in 2013 or earlier only three values can be obtained from the UR. Based on these values the average development over the captured period of time is calculated. The calculations are identical to the ones made with the variables of the HCE index.

	$ØΔC_x$ (change percentage range)			
	c1 AC1		c2 AC2	
Score	from	to	from	to
20 points (=upper fence)	0.76		125.40	
19 points	0.70	0.75	113.23	125.39
18 points	0.63	0.69	101.06	113.22
17 points	0.57	0.62	88.89	101.05
16 points	0.50	0.56	76.73	88.88
15 points	0.44	0.49	64.56	76.72
14 points	0.38	0.43	52.39	64.55
13 points	0.31	0.37	40.22	52.38
12 points	0.25	0.30	28.05	40.21
11 points	0.18	0.24	15.88	28.04
10 points	0.12	0.17	3.72	15.87
9 points	0.06	0.11	-8.45	3.71
8 points	-0.01	0.05	-20.62	-8.46
7 points	-0.07	-0.02	-32.79	-20.63
6 points	-0.14	-0.08	-44.96	-32.80
5 points	-0.20	-0.15	-57.13	-44.97
4 points	-0.26	-0.21	-69.29	-57.14
3 points	-0.33	-0.27	-81.46	-69.30
2 points	-0.39	-0.34	-93.63	-81.47
1 point	-0.45	-0.40	-105.79	-93.64
0 points (=lower fence)	-0.46		-105.80	

Table 5: Scoring system and outlier identification of variables AC1 and AC2
(own table based on own calculations)

As a last step, both variables are normalised utilising the same score-based classification approach applied earlier. Table 5 displays all classes and their respective scores. The scale of 20 points was chosen for comparability reasons with the HCE index.

4.2 LDA step 1: analysis of past cases

4.2.1 LDA1: classification of host country externality index by general features

4.2.1.1 Complete set of general feature variables

The analysis of Chinese OFDI transactions in Germany developed in the last chapter and will now be carried out[20]. LDA1, which predicts the HCE index with the help of general features of the cases, will be performed in this chapter and aims at establishing a reliable discriminant function with which future Chinese acquisitions

[20] It should be noted that the statistical descriptions in chapter 4.2 do not contain the complete generated SPSS output. All SPSS output which is not depicted here can be found in appendix B instead.

can be predicted in step 2 of the analysis. Firstly, LDA1 will be done including all five independent variables (b1-b5) and secondly, optimisations in the form of variable omission will be incorporated if necessary in order to further increase the reliability and prediction power of the model. In terms of significance levels (p-values) throughout the following interpretation of results, usually a level of 5% or below is considered to be the threshold for a reliable model in regression and discriminant analyses. However, since for the purposes of this thesis LDA is used as a means to predict the success of OFDI transactions, which have been found to be exceptionally multi-layered and case-based earlier, this level is hard to achieve. It is impossible to predict OFDI transaction outcomes with a 0% failure rate due to unpredictable uncertainties that arise in each individual case. However, this thesis' aspiration is not to provide fully safe future predictions, but identify tendencies observed in past transactions which are likely to steer future cases into a certain direction. Therefore a significance threshold of 25% is set instead.

Prior to the actual LDA, it shall be examined whether its assumptions are met. Firstly, it must be assured that any existing outliers and/or extreme values are detected and transformed or eliminated. In this case, the scoring-based classifications conducted in chapter 4.1.3 have transformed any outliers and/or extreme values into non-distorting scores. The elimination of outliers also ensures the assumption of normal distribution is met because it was established that only non-normalness induced by outliers (as opposed to skewness) impairs the prediction power of the model. Moreover, in order for the LDA to produce reliable results, homoscedasticity for each of the four groups of the dependent variable should be given. This can be tested with the Box's M statistic:

Test Results

Box's M		60,938
F	Approx.	,938
	df1	45
	df2	2322,501
	Sig.	,590

Table 6: LDA1 Box's M statistic *(own table based on own calculations)*

The test displays a significance level (p-value) of 59% which is well above the 5% threshold normally applied which means that the assumption of equal covariance

matrices cannot be rejected. Homoscedasticity can therefore be considered to be given for LDA1.

Lastly, the five independent variables must be independent among each other, i.e. the value of any one variable does not predict the value of another variable. Such multicollinearity can be detected with the help of a linear regression model that incorporates one of the predictors as dependent variable and the remaining ones as independent variables. The collinearity statistics display the variance inflation factors (VIF) for all variables and it is generally acknowledged that a VIF exceeding the value three indicates possible multicollinearity issues. In this case, all four predictors have VIFs well below this threshold and dependence among them can be ruled out.

Coefficients[a]

Model		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		Beta			Tolerance	VIF
1	(Constant)		10,586	,000		
	Industry	-,190	-1,279	,211	,810	1,235
	Region	,021	,143	,887	,823	1,214
	Company size (no. of employees)	-,636	-4,454	,000	,872	1,147
	Ownership structure of investor	,123	,840	,408	,830	1,205

Table 7: LDA1 Multicollinearity diagnostics *(own table based on own calculations)*

After all assumptions for the conduction of an LDA have been met, its results can now be discussed. Table 8 displays the overall Wilks' Lambda which is the normalised (range of 0 to 1) discrimination criterion and indicates how well each of the discriminant functions can group the cases of the dataset into the groups of the dependent variable. Wilks' Lambda is a reverse criterion so that a low value displays high discrimination power of the respective function.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 3	,540	18,169	15	,254
2 through 3	,771	7,663	8	,467
3	,951	1,496	3	,683

Table 8: LDA1 Wilks' Lambda *(own table based on own calculations)*

It can be seen that a total of three discriminant functions are used by LDA1 to classify into the four groups of the HCE index. In the case of such a multiple LDA the first step is to determine which of the functions are significant to the model and which should be ignored. As can be seen, the first function of the model has a Wilks' Lambda of 0.54 and is significant at the level of 25.4%. The latter is slightly above the threshold of 25% set out earlier and therefore is an indicator that this function is not performing well in terms of discriminating between the groups. The same holds true for the two remaining variables which display even higher p-values. In an attempt to identify possible optimisation potential, the next step is to analyse whether there are any predictor variables which have low prediction power and impair reliability of the overall model. Table 9 displays Wilks' Lambda and the significance level for each variable individually:

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
Stake in target company	,971	,311	3	31	,817
Industry	,796	2,643	3	31	,067
Region	,827	2,165	3	31	,112
Company size (no. of employees)	,877	1,449	3	31	,248
Ownership structure of investor	,918	,925	3	31	,440

Table 9: LDA1 Individual Wilks' Lambda for independent variables *(own table based on own calculations)*

The variables "stake in target company" and "ownership structure of investor" both indicate significance levels well above the 25% threshold and therefore the probability that the prediction power increases if the model is re-run without them is high.

4.2.1.2 Optimised set of general feature variables

The optimised LDA uses a different selection of independent variables and therefore some of its assumptions must be re-tested. Since no variables are added, but only existing ones eliminated, the earlier outlier analysis is still valid. Furthermore, the Box's M test yields a p-value of 15.4% which allows the assumption of homoscedasticity. The test for multicollinearity displays no problematic inter-predictor influences either.

The first output of the reduced and optimised LDA1 incorporating only three independent variables is the Wilks' Lambda table:

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 3	,614	14,890	9	,094
2 through 3	,803	6,677	4	,154
3	,954	1,422	1	,233

Table 10: Optimised LDA1 Wilks' Lambda *(own table based on own calculations)*

It can be seen that, just like in the original model, three discriminant functions were created, however, all of them remain beneath the 25% significance threshold. The first function indicates a Wilks' Lambda of 0.614 and its significance level is 9.4%. Thus it can be deduced that it has substantial discriminatory power and the null hypothesis can be rejected. Functions two and three also can be included in the further analysis of the model at significance levels of 15.4 and 23.3% respectively.

As a next step the three functions will be tested for their individual contributions to the discriminating powers of each of the three predictor variables:

Standardized Canonical Discriminant Function Coefficients

	Function		
	1	2	3
Industry	,725	,709	-,137
Region	-,332	,791	,633
Company size (no. of employees)	,422	-,173	,938

Table 11: Optimised LDA1 Standardised Canonical Discriminant Function Coefficients *(own table based on own calculations)*

Table 11 shows the standardised beta coefficients of each of the discriminant functions and the first function is found to highly add to the discriminating power of the predictor "industry" at a value of 0.725. The second one strongly contributes to the discrimination powers of the variables "region" and "industry", but performs poorly for "company size" with only a weak negative coefficient of -0.173. However, this third predictor variable is supported to a high degree by the third function at a value of 0.938. In summary, the three discriminant functions all make their individual contributions to the overall power and reliability of the LDA so that the decision to retain all of them is finalised.

The independent variables are examined separately for their actual discriminant power to classify cases between the four categories of the HCE index:

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
Industry	,796	2,643	3	31	,067
Region	,827	2,165	3	31	,112
Company size (no. of employees)	,877	1,449	3	31	,248

Table 12: Optimised LDA1 Wilks' Lambda for independent variables *(own table based on own calculations)*

The predictor "industry" has the highest prediction power with a p-value of 6.7% as is displayed in table 12. The variable "region" also remains well below the 25% threshold at a significance level of 11.2% and can thus be considered to discriminate well between the groups. With a p-value just below 25% the variable "company size" could possibly be eliminated from the analysis, however, the loss of overall information value would not constitute an even trade-off since already two variables were omitted from the original dataset. Therefore, all three variables can remain in the model.

The Eigenvalues table provides information on the variance contained in the model and how the discriminant functions contribute to its explanation. In the case of three functions, only their entirety will be able to explain 100% of the existing variance as is displayed in the "Cumulative %" row of table 13:

Eigenvalues

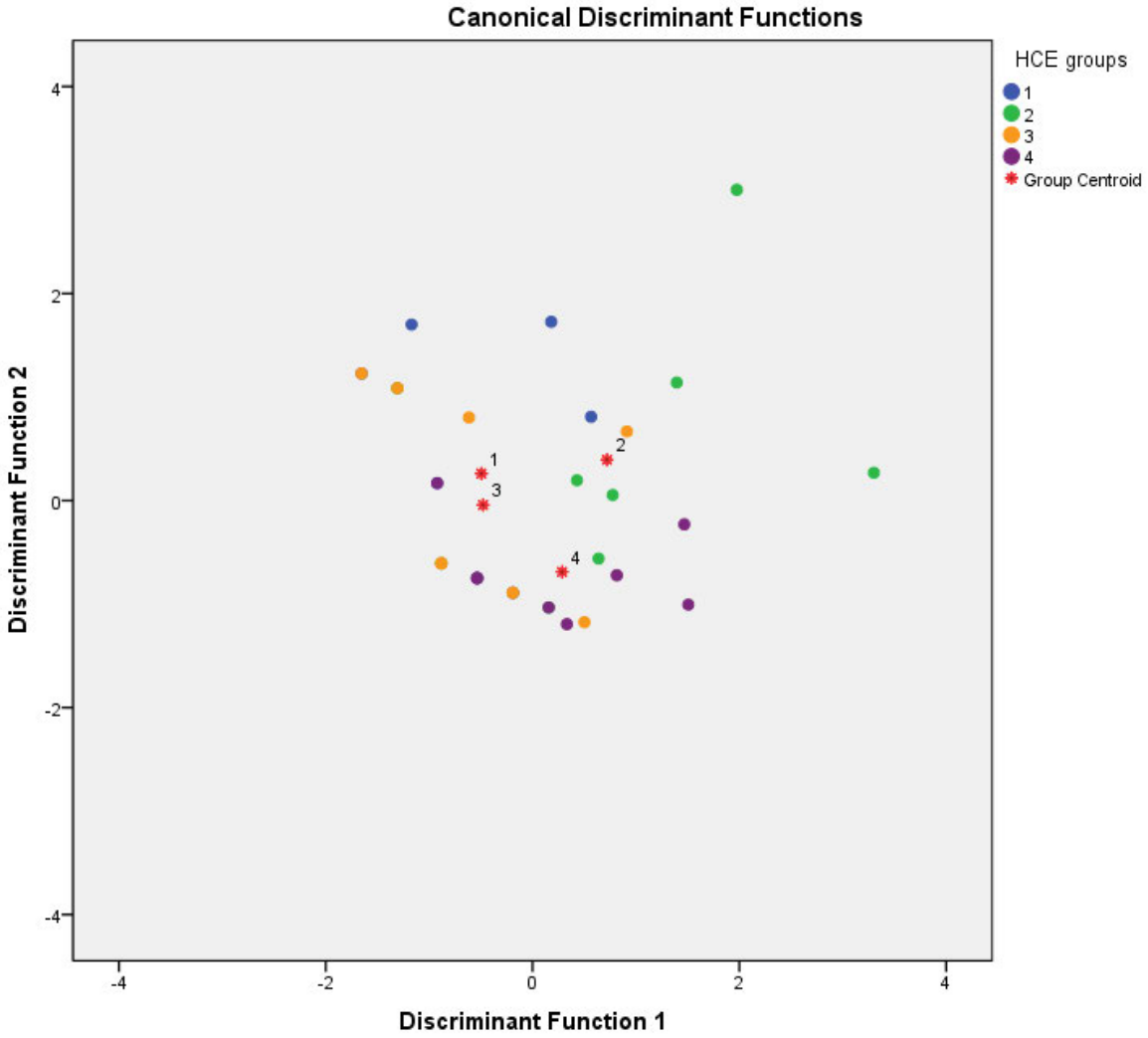
Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	,309[a]	56,7	56,7	,486
2	,188[a]	34,5	91,2	,398
3	,048[a]	8,8	100,0	,213

Table 13: Optimised LDA1 Eigenvalues *(own table based on own calculations)*

The results reflect the pattern found earlier in table 11, that the first discriminant function is the most powerful of the model. It therefore explains 56.7% of variance on its own while the second function explains 34.5% of the remaining variance. Again, the third function performs poorer and has limited explanation power. However, in order to secure the retention of the model's information value it is not eliminated. The canonical correlation describes the relationship between the dependent variable and the discriminant scores and the values for the first two functions are found to display

a rather strong relationship. This supports the finding that the entire model can discriminate well between the groups of the dependent variable.

With regards to the model's performance in predicting group membership of cases, the "Classification Results" table (appendix B.21) provides a comparison between the cases' actual and predicted memberships. The general rule is that prediction accuracy should exceed that of prediction by chance. In the case of four groups that means that the accuracy in the best case should be above 25%. The analysis yields diverse accuracy levels among the groups. While groups 1 and 3 only achieve values of 22.2%, groups 2 and 4 reach high levels of 55.6 and 75% respectively. The reason for the high likelihood of error in discrimination between groups 1 and 3 becomes obvious when examining the positions of the group centroids in the space established by the discriminant functions in graph 11:



Graph 11: Optimised LDA1 Combined groups plot *(own graph based on own calculations)*

The red stars represent the respective group centroids of the four groups and those of groups 1 and 3 are situated rather close together so that their cases' overall means do not differ much. The critical value in between them is not as long a distance away as for the other group centroids. Overall correct classifications amount to ca. 43% which is considerably more than the 25% minimum.

Briefly summarising all of the above analyses, it was shown that the original full data set version of LDA1 needed to be optimised through the elimination of two independent variables. This optimised LDA1 delivers good discriminant power which is limited by the expected restrictions that arise from the fact that OFDI transactions are a very complex and case-based undertaking with hard to predict characteristics. The final discriminant functions which will be used for the prediction of the HCE index based on the cases' general features are presented as follows:

$$D_{1(\mathrm{LDA1})} = -0.94 + 0{,}483 \times industry - 0{,}385 \times region + 0{,}346 \times company\ size$$
$$D_{2(\mathrm{LDA1})} = -2{,}772 + 0{,}472 \times industry + 0{,}917 \times region - 0{,}142 \times company\ size$$
$$D_{3(\mathrm{LDA1})} = -3{,}42 - 0{,}91 \times industry + 0{,}734 \times region + 0{,}768 \times company\ size$$

These functions are the base for the classification process applied in chapter 4.3 to generate the score of new OFDI cases in terms of their general characteristics.

4.2.2 LDA2: classification of host country externality index by absorptive capacity variables

After LDA1 has been carried out, LDA2 will be performed to complete the part of the model examining the performance of past OFDI transactions. From an operational perspective it will be conducted in the same way as LDA1 in order to guarantee full compatibility and comparability. However, instead of establishing classification rules based on cases' general features, it will use the data collected on AC1 and AC2. Once again, before starting the actual LDA, it must be assessed whether its required assumptions are met.

The absence of outliers and/or extreme values was achieved with the help of the classification approach which divided the range of AC1's and AC2's values into a 20-point score, the first and last categories of which transformed any outliers and/or extreme values into values that cannot distort the analysis anymore. Due to this outlier analysis also the assumption of normal distribution is met, since it was found earlier that non-normal distribution only impairs the analysis if it roots in the existence

of mentioned outliers. Furthermore, the Box's M test is used to assess whether homoscedasticity can be determined for LDA2:

Test Results

Box's M		16,837
F	Approx.	1,650
	df1	9
	df2	10434,954
	Sig.	,095

Table 14: LDA2 Box's M statistic
(own table based on own calculations)

It can be seen that with a p-value of 9 5% the 5% threshold is exceeded and therefore the assumption of equal covariance matrices cannot be rejected, which means that the discriminant scores can be reliably calculated by the model. Lastly, the model must be tested for multicollinearity, i.e. independence among the predictor variables.

Coefficients[a]

Model		Standardized Coefficients			Collinearity Statistics	
		Beta	t	Sig.	Tolerance	VIF
1	(Constant)		2,667	,012		
	Absorptive capacity 2 score	,298	1,795	,082	1,000	1,000

Table 15: LDA2 Multicollinearity diagnostics *(own table based on own calculations)*

As displayed in table 15, the VIF-value of one, which is well below the threshold of three, indicates no dependencies between the variables AC1 and AC2. All assumptions for the conduction of LDA2 are met and the model can be used to classify the AC measures into the groups of the HCE index.

The first step of the model assessment is the examination of the overall Wilks' Lambda which is presented in table 16:

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 2	,675	12,180	6	,058
2	,954	1,455	2	,483

Table 16: LDA2 Wilks' Lambda *(own table based on own calculations)*

The first observation that can be made is that LDA2 produced only two discriminant functions in order to classify into the groups. As mentioned in chapter 4.1.1, this is due to the fact that the amount of independent variables incorporated in the model is only two. While the first function is significant at the level of 5.8% and thus adds much prediction power to the model, the second one performs not as good at a value of 48.3%. In an attempt to search for possible optimisation potential, the individual predictor variables are assessed in table 17:

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
Absorptive capacity 1 score	,950	,538	3	31	,659
Absorptive capacity 2 score	,750	3,453	3	31	,028

Table 17: LDA2 Individual Wilks' Lambda for independent variables *(own table based on own calculations)*

The first AC measure AC1, which is based on the patents/employee ratio, achieves only poor discriminant power at a p-value of 65.9%. On the other hand, AC2 displays a high level of significance at 2.8% which is well below the threshold of 25%. Based on these findings, the model should be re-run after AC1 has been omitted, however, the information loss for LDA2 would be significant if the data on patent applications by German companies would be eliminated from the analysis. In order to better assess how large the impact of the omission would be, tables 18 and 19 compare the classification results of LDA2 with both AC measures, and LDA2 with only AC2 respectively (percentages highlighted in yellow):

Classification Results[a]

			Predicted Group Membership				
		HCE groups	1	2	3	4	Total
Original	Count	1	3	1	4	1	9
		2	0	4	3	2	9
		3	1	3	5	0	9
		4	0	0	3	5	8
	%	1	33,3	11,1	44,4	11,1	100,0
		2	,0	44,4	33,3	22,2	100,0
		3	11,1	33,3	55,6	,0	100,0
		4	,0	,0	37,5	62,5	100,0

a. 48,6% of original grouped cases correctly classified.

Table 18: LDA2 Classification Results full dataset *(own table based on own calculations)*

Classification Results[a]

		HCE groups	Predicted Group Membership 1	2	3	4	Total
Original	Count	1	3	0	5	1	9
		2	0	0	7	2	9
		3	3	0	6	0	9
		4	0	0	3	5	8
	%	1	33,3	,0	55,6	11,1	100,0
		2	,0	,0	77,8	22,2	100,0
		3	33,3	,0	66,7	,0	100,0
		4	,0	,0	37,5	62,5	100,0

a. 40,0% of original grouped cases correctly classified.

Table 19: LDA2 Classification Results optimised dataset *(own table based on own calculations)*

Keeping in mind that a classification by chance would yield a maximum of 25% correctly classified cases, the values highlighted in yellow show that the overall performance is reduced from a robust ca. 50 to 40% to a very mixed result upon omission of AC1. The amount of correctly classified cases belonging to class 2 falls from 44.4 to 0%. This finding, in combination with the mentioned loss of information value, leads to the decision that both AC1 and AC2 remain in the model and will be used for the later prediction of new cases.

As a next step the three functions will be tested for their respective contributions to the discriminating powers of the two independent variables AC1 and AC2.

Standardized Canonical Discriminant Function Coefficients

	Function 1	2
Absorptive capacity 1 score	-,501	,953
Absorptive capacity 2 score	1,070	,113

Table 20: LDA2 Standardised Canonical Discriminant Function Coefficients *(own table based on own calculations)*

The decision to retain both predictors in the model is supported, since it is indicated that both are backed by one of the two discriminant functions respectively. Function 2 is adding to the discriminant power of AC1, and vice versa.

In terms of the Eigenvalues it can be seen that the two functions in combination explain 100% of the existing variance in the model. However, it also becomes obvious

that while the first function alone explains 89.6% of variance the second one only adds 10.4%. This is in line with the earlier finding that AC1 (which is backed by function 2 as seen in table 20) has significantly less discriminant power than AC2.

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	,413[a]	89,6	89,6	,541
2	,048[a]	10,4	100,0	,214

Table 21: LDA2 Eigenvalues *(own table based on own calculations)*

Also the canonical correlation values reflect the limited significance of function 2 and the high power of function 1 thus support the finding that LDA2, in its entirety, can discriminate well between the four groups of the HCE index.

Summarising the results from the conduction of LDA2 it is found that the model is made up of two AC measures, one of which adds high discriminant power to it, and the other one of which performs not so well. However, under consideration of all aspects, it is decided to not omit any predictors from the analysis and to maintain the original dataset. The two discriminant functions are denominated as follows:

$$D_{1(\mathrm{LDA2})} = -1.926 - 0.105 \times AC1 + 0.259 \times AC2$$
$$D_{2(\mathrm{LDA2})} = -2.049 + 0.2 \times AC1 + 0.027 \times AC2$$

For the prediction of the HCE index with respect to cases' AC measures, these two functions form the base for the derivation of classification functions.

4.2.3 Characterisation of HCE index groups

Prior to proceeding with the prediction of new cases, this chapter provides an overview of the classification results in terms of the underlying dataset and its collection of past cases. The analysis is conducted by comparing each independent variable's pre-classification distribution (see chapter 4.1.3.1) to the distribution each respective variable has within the HCE index' groups[21]. This way assertions can be made with regard to which group e.g. is characterised by an amount of target companies from the North of Germany that deviates greatly from the distribution prior to the classification etc.

[21] The full analysis table can be found in appendix A.7.

Cases that were classified into the first group (“not recommended”) performed badly in terms of the development of their HCE index variables. The independent variable that displays the largest deviation from its pre-classification distribution is company size. There are almost twice as many companies with <=100 employees in this group than in the unclassified distribution. At the same time, there are no companies which have 1001-2000 or >2000 employees indicating that especially small companies have a higher risk of performing badly after acquisition. In terms of industries, it can be observed that much less automotive companies end up in group 1 revealing that they generally have good outcomes from Chinese OFDI transactions. Companies from the metals industry on the other hand can be found more often in this category. AC1 (patents/employee) displays a higher amount of companies with bad performance than in the original distribution. This means that, as could be expected, a low AC1 level tends to indicate a low overall group recommendation.

In terms of the second group (“rather not recommended”) the most significant deviation from the original distribution can be found with machinery companies. Only half as many of them as compared to the pre-classification distribution perform below average. Furthermore, with regard to AC1 (patents/employee) there are much less cases in the first category of it which corresponds to the fact that companies with low AC1 performance were found to tend to belong to the first group.

Group 3 (“rather recommended”) supports the observation, that group 2 contains only little machinery companies. These to a large degree belong to group 3 translating into an overall tendency for companies belonging to the metals industry to perform rather well. Automotive companies on the other hand are less often found than expected which leads to the presumption that they must be strongly represented in the last group. Moreover, target companies from the South of Germany are likely to belong to this group with an almost twice as high probability than in the original distribution.

Group 4 (“fully recommended”) confirms the presumption made with respect to the automotive industry. They display a very high probability of belonging into this group indicating their very good performance in acquisitions by Chinese investors. Another characteristic which is likely to lead to a very good performance is if the target company is located in the Northern region of Germany.

It was established that small companies are likely to belong to group 1, and this observation is confirmed by the fact that the same group of companies (<=100) is

very unlikely to be classified into group 4. In terms of AC2, a very high level of it translates into a significantly higher probability of belonging to the "fully recommended" group. The fact that AC2 levels have high influence on the overall performance of a target company confirms the results of the previous chapter in which the discrimination power of it showed to be high. AC1 on the other hand performed not as good and this is also reflected in the fact that its values have no explicit impact on the HCE index' group belongingness. In summary, the three most significant characteristics leading to a German target company to be "not recommended" (group 1) for acquisition by a Chinese investor are:

(i) <=100 employees (company size),

(ii) metals (industry), and

(iii) East of Germany (region).

The three most significant characteristics leading to a German target company to be "fully recommended" (group 4) for acquisition by a Chinese investor are:

(i) High F/A turnover ratio (AC2),

(ii) North of Germany (region), and

(iii) automotive (industry).

4.3 LDA step 2: success prediction of new cases

4.3.1 Validation of prediction accuracy of the linear discriminant analyses with existing cases

The descriptive parts of LDA1 and LDA2 were covered above and the classification rules for new cases were established with the help of running the two discriminant analyses. This chapter consequently covers the actual allocation of new cases to the groups of the HCE index in terms of their general features and AC measures respectively. Due to the fact that a dataset of 35 cases exists of which the true group belongingness is known, these past cases can be used to assess the classification performance of the developed model (Meyers et al., 2013, p. 604). Further, the LDAs' classification rules shall be implemented in a user-friendly tool which allows the input of a new case's data for each of the independent variables and generates its predicted HCE index score. The underlying logic of the assignment of new cases is to compare a new case's value for each variable to the mean that each variable has achieved within the groups of the dependent variable respectively (Rencher &

Christensen, 2012, p. 310). In this case, the new observation is being compared to four groups with their four means representing the categories of the HCE index. The observation is then assigned to the group, the mean of which its value is closest to. For this group, the probability of belongingness is highest, and the probability of misclassification is lowest. For the classification into a two-group dependent variable the discriminant function itself acts as the linear classification function into which a new case's values are inserted to generate the classification score (Rencher & Christensen, 2012, p. 312). However, for multi-group cases like this, the belongingness is computed with the help of dedicated linear classification functions (C) (ibid., p. 314). For each group there is one classification function which indicates the probability of belongingness through its score. In this case, four classification functions, into which the values of a new observation can be inserted, must be generated. The classification functions have the same linear layout as the discriminant functions calculated earlier. For LDA1 the four classification functions are presented as follows:

$$C_{1(\mathrm{LDA1})} = -11.084 + 1.36 \times industry + 4.932 \times region + 2.152 \times company\ size$$
$$C_{2(\mathrm{LDA1})} = -13.803 + 1.981 \times industry + 4.813 \times region + 2.792 \times company\ size$$
$$C_{3(\mathrm{LDA1})} = -12.113 + 1.174 \times industry + 5.052 \times region + 2.625 \times company\ size$$
$$C_{4(\mathrm{LDA1})} = -9.826 + 1.273 \times industry + 3.877 \times region + 2.681 \times company\ size$$

As can be seen, each of the groups of the HCE index is represented by one function which contains a constant and the three predictors used in the optimised model of LDA1. In the case of the AC measures in LDA2 on the other hand, there are only two independent variables (AC1 and AC2) included:

$$C_{1(\mathrm{LDA2})} = -4.686 + 0.197 \times AC1 + 0.501 \times AC2$$
$$C_{2(\mathrm{LDA2})} = -5.185 + 0.32 \times AC1 + 0.435 \times AC2$$
$$C_{3(\mathrm{LDA2})} = -4.426 + 0.195 \times AC1 + 0.475 \times AC2$$
$$C_{4(\mathrm{LDA2})} = -8.177 + 0.105 \times AC1 + 0.839 \times AC2$$

The classification performance of the LDAs can be tested by entering the values of an existing case from the dataset into their classification functions. Since the true group belongingness of an existing case is known, it can be checked whether the carried out analyses group the case in question into its true group or a wrong one. Based on the earlier examinations regarding the LDAs' discrimination powers, it can be expected that the majority of test cases should be grouped correctly, but wrong

classifications will not be completely avoided either. The following three cases were randomly selected from the dataset and their group belongingness validated with the help of the LDAs:

(i) acquisition of *TGE Gas Engineering GmbH* by *China International Marine Container Co., Ltd.*,

(ii) acquisition of *DyStar Colours Distribution GmbH* by *Zhejiang Longsheng Group Co., Ltd.*, and

(iii) acquisition of *HAZEMAG & EPR GmbH* by *Sinoma International Engineering Co., Ltd.*.

(i) This Sino-German OFDI transaction conducted in 2008 (which means data can be collected over four time periods) involves a target company which is active in the machinery industry and located in the Western region of Germany. Its number of employees amounts to about 120. The target company was able to improve its sales, F/A, and employee numbers so that it scores the highest group of the HCE index and would receive a full recommendation if it were to be carried out again. In order to test the model for correct classification results, the values of all independent variables of this case are entered into the classification variables of LDA1 and LDA2:

$$C_{1,\mathrm{TGE(LDA1)}} = -11.084 + 1.36 \times 1 + 4.932 \times 2 + 2.152 \times 4 = 8.748$$
$$C_{2,\mathrm{TGE(LDA1)}} = -13.803 + 1.981 \times 1 + 4.813 \times 2 + 2.792 \times 4 = 8.972$$
$$C_{3,\mathrm{TGE(LDA1)}} = -12.113 + 1.174 \times 1 + 5.052 \times 2 + 2.625 \times 4 = 9.665$$
$$C_{4,\mathrm{TGE(LDA1)}} = -9.826 + 1.273 \times 1 + 3.877 \times 2 + 2.681 \times 4 = \mathbf{9.925}$$

$$C_{1,\mathrm{TGE(LDA2)}} = -4.686 + 0.197 \times (-0.298) + 0.501 \times 148.389 = 69.598$$
$$C_{2,\mathrm{TGE(LDA2)}} = -5.185 + 0.32 \times (-0.298) + 0.435 \times 148.389 = 59.269$$
$$C_{3,\mathrm{TGE(LDA2)}} = -4.426 + 0.195 \times (-0.298) + 0.475 \times 148.389 = 66.001$$
$$C_{4,\mathrm{TGE(LDA2)}} = -8.177 + 0.105 \times (-0.298) + 0.839 \times 148.389 = \mathbf{116.290}$$

The results for LDA1 display that this case's highest probability of belongingness is group 4 ("fully recommended") with a value of 9.925. Since the results for the four groups are relatively close to each other, the classification power can be considered to be of average accuracy. The results of LDA2 display a more distinct result. Again, group 4 ("fully recommended") achieves the highest score with a value of 116.29. However, here the top score is significantly higher than all other ones, allowing the conclusion of an unambiguous classification result. In terms of its AC capabilities, *TGE Gas Engineering GmbH* performs strongly and translates the liquidity provided

by the Chinese investors into a growing business that helps to create HCEs in the host country economy. Both LDAs' scores added up lead to the overall recommendation with respect to this transaction, and the developed model has exhibited the correct classification of group 4 ("fully recommended") on the HCE index' score range presented in table 5.

(ii) The second transaction examined is the acquisition of the German chemicals company *DyStar Colours Distribution GmbH* in 2011 (four data periods available). It is located in Western Germany and employs about 250 people. While investments into the company's F/A could be recorded, the sales and employment figures decreased. This transaction's true group belongingness is group 2 ("rather not recommended").

$$C_{1,\mathrm{DyStar(LDA1)}} = -11.084 + 1.36 \times 5 + 4.932 \times 2 + 2.152 \times 2 = 9.884$$
$$C_{2,\mathrm{DyStar(LDA1)}} = -13.803 + 1.981 \times 5 + 4.813 \times 2 + 2.792 \times 2 = \mathbf{11.312}$$
$$C_{3,\mathrm{DyStar(LDA1)}} = -12.113 + 1.174 \times 5 + 5.052 \times 2 + 2.625 \times 2 = 9.111$$
$$C_{4,\mathrm{DyStar(LDA1)}} = -9.826 + 1.273 \times 5 + 3.877 \times 2 + 2.681 \times 2 = 9.655$$

$$C_{1,\mathrm{DyStar(LDA2)}} = -4.686 + 0.197 \times 0.416 + 0.501 \times (-23.223) = -16.239$$
$$C_{2,\mathrm{DyStar(LDA2)}} = -5.185 + 0.32 \times 0.416 + 0.435 \times (-23.223) = \mathbf{-15.154}$$
$$C_{3,\mathrm{DyStar(LDA2)}} = -4.426 + 0.195 \times 0.416 + 0.475 \times (-23.223) = -15.376$$
$$C_{4,\mathrm{DyStar(LDA2)}} = -8.177 + 0.105 \times 0.416 + 0.839 \times (-23.223) = -27.618$$

Both in LDA 1 and LDA 2 this transaction only performs below average with its highest classification scores in the second groups ("rather not recommended"). While for LDA1 the decision is unambiguous, for LDA2 it is very close to group 3 ("rather recommended"), indicating that in AC performance it was slightly better than in terms of its general features. Overall, the model would classify the acquisition of *DyStar Colours Distribution GmbH* into group 2 "rather not recommended" would it be a future case.

(iii) *HAZEMAG & EPR GmbH* was acquired in 2013 (three data periods available) by *Sinoma International Engineering Co., Ltd.* and is a machinery company from the West of Germany with about 200 employees. Its true group belongingness has been defined as group 2 ("rather not recommended") in the earlier analysis. Its classification scores for both analyses are presented as follows:

$$C_{1,\text{Hazemag(LDA1)}} = -11.084 + 1.36 \times 1 + 4.932 \times 2 + 2.152 \times 2 = 4.444$$
$$C_{2,\text{Hazemag(LDA1)}} = -13.803 + 1.981 \times 1 + 4.813 \times 2 + 2.792 \times 2 = 3.388$$
$$C_{3,\text{Hazemag(LDA1)}} = -12.113 + 1.174 \times 1 + 5.052 \times 2 + 2.625 \times 2 = 4.415$$
$$C_{4,\text{Hazemag(LDA1)}} = -9.826 + 1.273 \times 1 + 3.877 \times 2 + 2.681 \times 2 = \mathbf{4.563}$$

$$C_{1,\text{Hazemag(LDA2)}} = -4.686 + 0.197 \times (-0.179) + 0.501 \times 6.384 = -1.523$$
$$C_{2,\text{Hazemag(LDA2)}} = -5.185 + 0.32 \times (-0.179) + 0.435 \times 6.384 = -2.465$$
$$C_{3,\text{Hazemag(LDA2)}} = -4.426 + 0.195 \times (-0.179) + 0.475 \times 6.384 = \mathbf{-1.428}$$
$$C_{4,\text{Hazemag(LDA2)}} = -8.177 + 0.105 \times (-0.179) + 0.839 \times 6.384 = -2.840$$

As becomes visible, in this case the classification results between LDA1 and LDA2 differ with the transactions' general features belonging to group 4 ("fully recommended"), and its AC performance to group 3 ("rather recommended"). The overall result indicates group 3 ("rather recommended") which is not in line with the group it is truly belonging to. Therefore, an exactly identical transaction would be classified wrongly should it be carried out in the future.

On average, the classification accuracy test of the model presents stable results with two out of three cases correctly categorised. Under consideration of the complex and multi-layered nature of OFDI transactions, it can be interpreted to be a good indicator which is able to support the OFDI decision-making process.

4.3.2 Setup and test of success-predicting model for new cases

4.3.2.1 Description of success-predicting model with dashboard user interface

After the developed model could successfully be evaluated adequate to predict already existing cases from the dataset, it can now be embedded in a user-friendly interface which performs the classification calculations of LDA1 and LDA2 and as a final result displays a recommendation according to the four groups of the HCE index variable. For reasons of its widespread availability and compatibility, Microsoft Excel[22] will be used as development environment for the interface, which will have a management dashboard-like appearance to ensure easy comprehensibility. Its main objective is to enable the user to enter information on the general features as well as ACs performance of any German target company and test its predicted success probability after being acquired by a Chinese OFDI investor. The mentioned user-friendliness will be realised through the fact that no calculations on the user's behalf

[22] A Microsoft Excel file containing the fully functioning version of the dashboard is handed in as part of this thesis.

are necessary, but only the input of raw data as available from any financial statement of a given company. For example, instead of having to determine the F/A turnover ratio of AC2 themselves, users only need to enter the required raw financial data required by its formula (see chapter 4.1.3.2) into the dashboard. Overall, this dashboard is the tool with which the success-prediction capabilities of the earlier analysis are transformed into an accessible way of applying them in a general international business context. Users desiring the ability to reproduce the results have the option of accessing the calculation section of the model by scrolling below the dashboard area. Here, the Excel functions used to process the entered data, the underlying classification functions, as well as the interim results can be viewed.

Due to the dimensional size of the model, for the following explanations the dashboard and calculation sections are split into five separate parts, the first of which is displayed in figure 3:

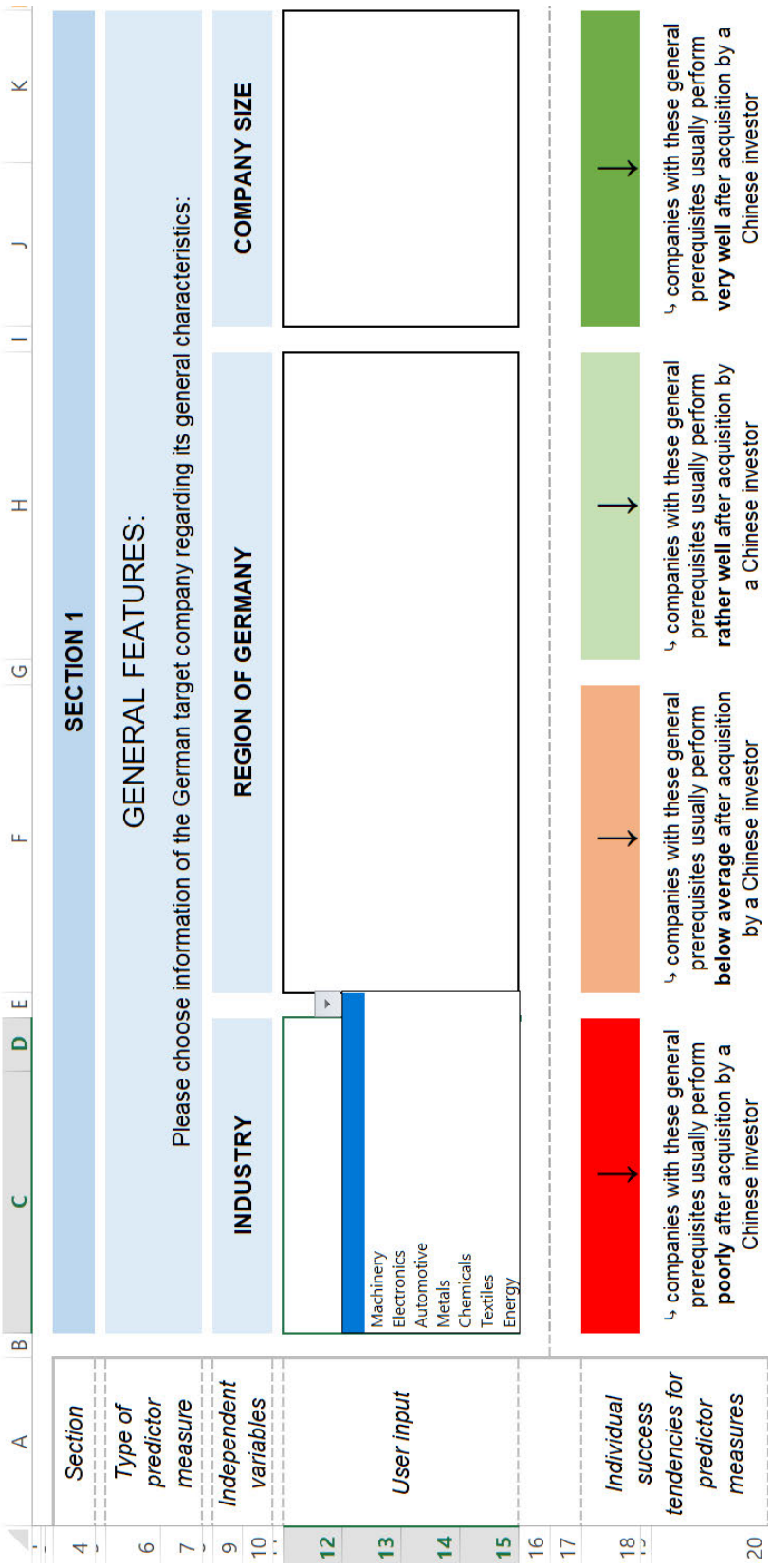


Figure 3: Success-predicting model part 1: LDA1 dashboard *(own figure based on own research)*

This first section corresponds to LDA1 of the earlier analysis in which three independent variables concerning the general features of German target companies were used to classify the dataset's cases into the groups of the HCE index. These

three variables are “industry” (cell C9)[23], “region” (cell F9) as well as “company size” (cell J12) and as was explained earlier, all of them are of nominal or ordinal measurement levels. This is the reason why the cells into which the user enter their information are coded as drop-down selection cells (C12, F12, J12) as is exemplarily shown for the input of “industry”[24] in figure 3. The three predictors’ values are fed into cells (C44, F44, H44) in the calculation section which is depicted in figure 4:

[23] References to cells that span over more than one row and/or column are denominated by the respective combination of the first row and column they cover.

[24] The model is based upon a dataset containing target companies from only seven different industries. Thus, a new case from any other industry cannot be predicted as of yet. An analysis encompassing all existing industry sectors would require a large-scale expansion of the dataset and would exceed the scope of this thesis.

	A	B	C	D	E	F	G	H	I	J	K
33		Categories of "Industry"			Categories of "Region"		Categories of "Company size"				
34											
35		1	Machinery		1	North	1	<=100			
36		2	Electronics		2	West	2	101-500			
37		3	Automotive		3	East	3	501-1000			
38		4	Metals		4	South	4	1001-2000			
39		5	Chemicals				5	>2000			
40		6	Textiles								
41		7	Energy								
42											
43		Input "Industry":			Input "Region":		Input "Company Size":				
44	User input:		0			0		0			
45		Classification scores:			Classification scores:		Classification scores:				
46	LDA1 Score 1:		0			0		0		LDA1 Total 1:	0
47	LDA1 Score 2:		0			0		0		LDA1 Total 2:	0
48	LDA1 Score 3:		0			0		0		LDA1 Total 3:	0
49	LDA1 Score 4:		0			0		0		LDA1 Total 4:	0
50											
51					Classification functions of LDA1:						
52		Constant:			"Industry" coefficient:		"Region" coefficient:			"Company size" coefficient:	
53	LDA1 Group 1:		-11.084			1.36		4.932			2.152
54	LDA1 Group 2:		-13.803			1.981		4.813			2.792
55	LDA1 Group 3:		-12.113			1.174		5.052			2.625
56	LDA1 Group 4:		-9.826			1.273		3.877			2.681

Figure 4: Success-predicting model part 2: LDA1 calculation *(own figure based on own research)*

The user input is then inserted into LDA1’s four classification functions that were calculated in chapter 4.3.1. The functions for all four groups of the HCE index can be found at the bottom of figure III in rows 53-56. The classification scores of all three functions are then displayed in rows 46-49, where additionally the accumulated

scores can be found in column K. Based on these total scores, the HCE index group to which the entered German target company predictably belongs according to LDA1 alone (i.e. the group with the highest total classification score), can be determined. This is reflected in row 18 of the dashboard section of LDA1 in figure 3. In cells C18, F18, H18, and J18, the traffic light-inspired colour-coding system introduced in chapter 4.1.3.1 is implemented in order to inform the user which recommendation is made for the new case solely based on its general features. This way, besides the overall result, the dashboard can generate a more differentiated sub-result which allows to individually assess the performance of the new case not only in total, but also in terms of its general features as well as absorptive capacities separately. Whichever recommendation is made is marked by a downwards-facing arrow which points to an explanation text that explains what this recommendation means.

Analogous to LDA2, in the right-hand side of the dashboard part the user enters the new case's information with respect to its AC. As was established in the earlier analyses, AC is quantified with the help of the two measures of "patents per employee" and "F/A turnover ratio". Both of them are based upon a calculation involving more than one key figure. As figure 5 shows, the dashboard is designed in such a way, that the user simply has to insert the key figures without any prior calculations (cells N12, P12 for AC1, and cells S12, U12, W12 for AC2).

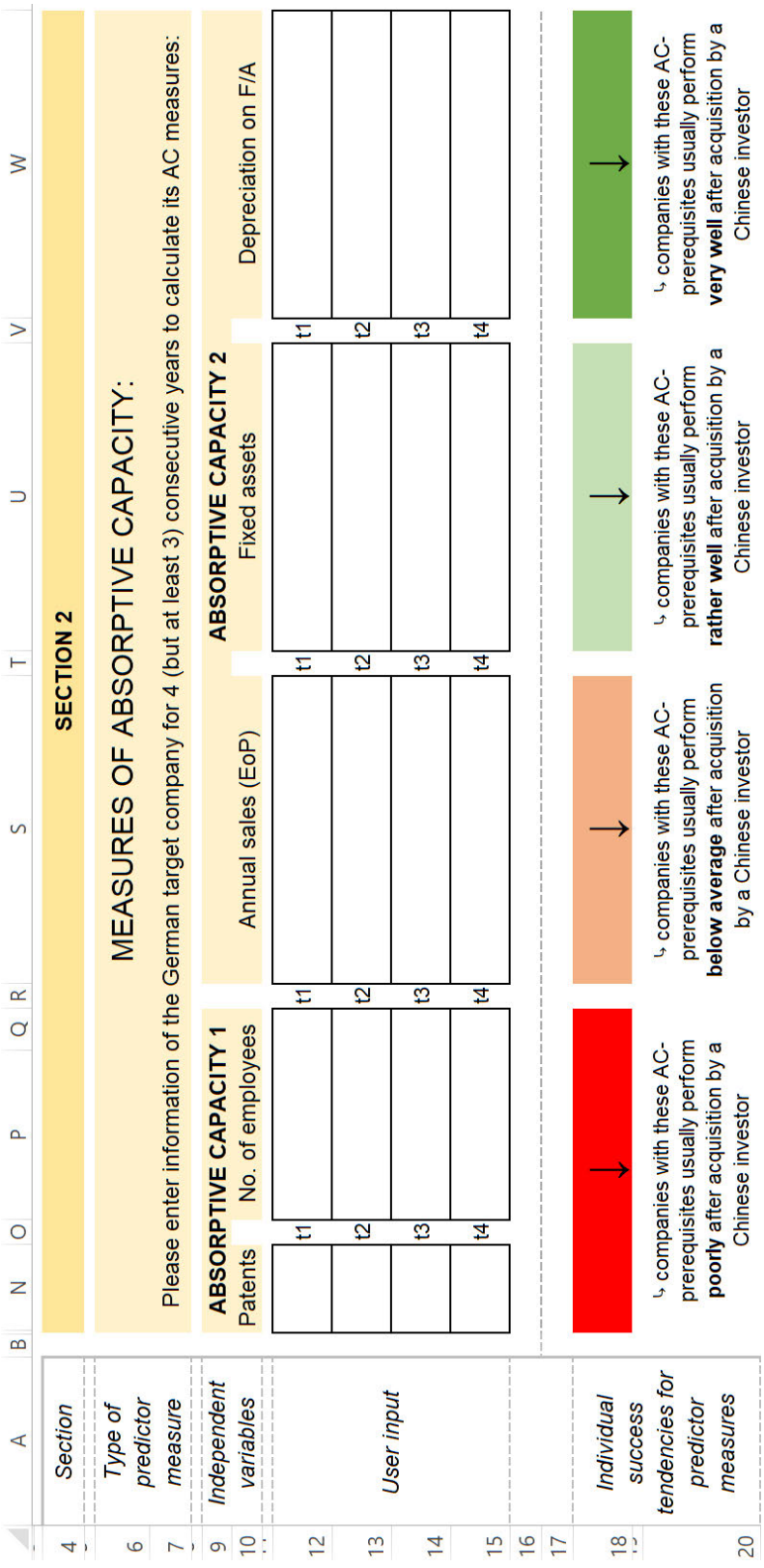


Figure 5: Success-predicting model part 3: LDA2 dashboard *(own figure based on own research)*

Furthermore, it was established that the independent variables of LDA2 are time period-based, just like the dependent variable HCE index. Therefore the data entered for LDA2 is required to cover a time period of four consecutive years, which should be as recent as possible. The entering of data covering only three years is also

allowed, in case of which row 15 marked “t4” must be left blank. Cell U44 of the LDA2 calculation section depicted in figure 6 contains the necessary calculation steps to calculate AC1. The implemented IF-function can distinguish between three or four year-spanning data inputs and calculates the “patents per employee” measure by dividing the two values according to the rule established in chapter 4.1.3.2. Likewise for AC2, cell W44 determines the “F/A turnover ratio” for each period and then calculating the average of their differential amounts. Again, the traffic light colour-system is used to give an interim result on the performance of the new case in terms of its AC measures (cells N18, S18, U18, W18).

The numbers are then fed into the classification functions of LDA2 which are located in rows 53-56 to determine the classification scores for all four groups. Cells Z46-Z49 display the accumulated scores for AC1 and AC2. Finally, in cells AC46-AC49 the scores of LDA1 and LDA2 are summed up in order to obtain the total classification score and thereby the final recommendation for the analysed new case. Based on these scores the last section of the dashboard provides four possible recommendations each of which corresponds to one of the groups of the HCE index. Figure 7 shows that if the new case is predicted to belong to group 1, cell H24 reads “not recommended”. For group 2, cell J24 shows “rather not recommended” whereas the first positive outcome (corresponding to group 3) is represented by “rather recommended” in cell N24. Only if the new case is predicted to perform very well, will cell S24 give out the label “fully recommended”.

	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
43						**Input "AC1":**		**Input "AC2":**					**LDA1+2 Total Score:**	
44	**User input:**					0		0						
45						**Classification scores:**		**Classification scores:**						
46	**LDA2 Score 1:**					0		0		**LDA2 Total 1:**	*0*		**LDA1+2 Total Score 1:**	***0***
47	**LDA2 Score 2:**					0		0		**LDA2 Total 2:**	*0*		**LDA1+2 Total Score 2:**	***0***
48	**LDA2 Score 3:**					0		0		**LDA2 Total 3:**	*0*		**LDA1+2 Total Score 3:**	***0***
49	**LDA2 Score 4:**					0		0		**LDA2 Total 4:**	*0*		**LDA1+2 Total Score 4:**	***0***
50														
51				**Classification functions of LDA2:**										
52				**Constant:**		**"AC1" coefficient:**		**"AC2" coefficient:**						
53	**LDA2 Group 1:**			-4.686		0.197		0.501						
54	**LDA2 Group 2:**			-5.185		0.32		0.435						
55	**LDA1 Group 3:**			-4.426		0.195		0.475						
56	**LDA1 Group 4:**			-8.177		0.105		0.839						

Figure 6: Success-predicting model part 4: LDA2 calculation *(own figure based on own research)*

	A	B	H	I	J	K	L	M	N	O	P	Q	R	S
23			**OVERALL RECOMMENDATION BASED ON GENERAL FEATURES AND ABSORPTIVE CAPACITY**											
24	*Overall result*		**NOT RECOMMENDED**		**RATHER NOT RECOMMENDED**				**RATHER RECOMMENDED**					**FULLY RECOMMENDED**
26			↳ these companies either perform **poorly in sections 1 and 2**, or **have a very bad performance in one of them**		↳ these companies either perform **below average in sections 1 and 2**, or **have a bad performance in one of them**				↳ these companies either perform **above average in sections 1 and 2**, or have a **good performance in one of them**					↳ these companies either perform **well in sections 1 and 2**, or have a **very good performance in one of them**

Figure 7: Success-predicting model part 5: LDA1 and 2 overall recommendation *(own figure based on own research)*

When working with the model, it is important to be aware of the fact that it is designed in such a way that it can only display proper prediction results when all necessary information is entered and no input cells are left blank (except the t4-row in section 2 which is optional). Also, attention should be given to the uniformity of the entered data, i.e. the financial data should all not only be of the same currency, but also recorded at the same time of measurement (e.g. beginning- or end-of-period). In this context, all data must cover the same time period, too.

The described dashboard-style success-predicting model effectively translates the linear discriminant analyses carried out in SPSS into an accessible format which allows the quick prediction of success probabilities of Sino-German OFDI transactions. The input required to receive the model's recommendation is based on easily obtainable information about the target company so that not only internal firm members can perform the analysis.

4.3.2.2 Application of success-predicting model for new case prediction

In order to test the developed model in a real-world scenario and provide an understanding of the interpretation of its findings, it will be applied to a case that was current at the time of writing of this thesis. This new case involves a German company which, as of summer 2017, is actively trying to attract foreign investors for any reason (e.g. operational, financial etc.). Additionally, due to the previously mentioned scope limitations, the company must be active in one of the seven industry sectors that are covered by the underlying dataset. A suitable example is found with the solar energy company *SolarWorld AG* that has production facilities in the East of Germany and more than 2,000 employees. In May 2017 the company filed for insolvency due to price erosion in the entire industry and is currently searching for an investor who can provide the capital needed to restore its liquidity (Hubik, 2017; IWR, 2017).

This is the starting point where the success-predicting model can be utilised for the evaluation of the prospects in case *SolarWorld AG* is going to be acquired by a Chinese investor. The necessary company data is sourced from the UR and DPMA's web portals (UR, 2017; DPMA, 2017) and entered into the dashboard of the model[25]. The first part of the analysis is the assessment of the company's general features. It is shown that the combination of a large-sized company producing in the East of Germany from the energy sector has the tendency to perform below average after

[25] The complete filled-in model can be found in appendix C.

acquisition by a Chinese investor, as indicated by the arrow suggesting a high probability of belongingness to group 2 (“rather not recommended”) in terms of LDA1. In terms of the second section, the AC measures predict a very good performance in the way that *SolarWorld AG* will absorb the funding provided by a potential Chinese investor. Therefore, for LDA 2 the arrow here points to the fourth group (“fully recommended”) of the HCE index.

LDA1 and LDA2 predict different group belongingness of the new case which means that the overall recommendation will be dependent on how much larger the classification score in both analyses is compared to the remaining three groups. For the general features, the probability that *SolarWorld AG* belongs to group 2 (“rather not recommended”) is about 16.7% higher than for the second-most probable group. With the AC measures (predicted in group 4), this gap amounts to ca. 65.3% which allows the conclusion that the group prediction of LDA2 is very likely to be reflected in the overall recommendation found in the bottom part of the dashboard. This can be confirmed and thus the final result of the model is that an acquisition of *SolarWorld AG* by a Chinese OFDI investor is “fully recommended”. This recommendation can be considered to be a helping factor within the complex task which the overall investment decision represents. It can provide success predictions based upon already completed transactions and project their development into the new case. It can never serve as a sole decision-making instrument since, as was mentioned in this thesis oftentimes, OFDI is a very complex and multi-layered instrument in need of careful planning. The success-predicting model developed in this thesis is hoped to add another tool supporting a right and informed decision.

5 Conclusion

5.1 Summary

Before referring back to the initially laid out research questions, this chapter will provide a summary of the findings of this thesis. Chapter 2 assumed the position of the home country in an OFDI transaction that entails the involvement of business parties from two different countries. More specifically in chapter 2.1, it was established that the direct investor of such OFDI activities has a long-term interest in the target company which is reflected in a minimum acquisition amount of ten percent of all shares. While in the past OFDI mostly only followed one underlying strategy at a time, such as natural resource-seeking, market-seeking, efficiency-seeking as well

as strategic asset or capability-seeking, the motives of the majority of today's direct investors include at least two of these objectives reflecting the increased complexity of the globalised business environment. Moreover, it became clear that it was this globalisation process which inseparably interconnected OFDI with the world's large MNEs expanding their activities across the globe through the acquisition of affiliates. The work of numerous authors was reviewed and a distinction between the early theories and more recent advancements explaining MNEs' expansion efforts was identified. Whereas during the 1960s and 70s the pioneer works in this research field emphasised the rent-maximisation based on existing competitive advantages as a driver for MNEs' OFDI activity, the authors from 1980s onwards increasingly focused on the relationship between the direct investor and its foreign entities. Before, the focus only lay on the direct investor somewhat degrading the target company to a submissive affiliate. Especially Dunning's OLI paradigm for a long time was considered to be the main reference for FDI researchers with its multi-approach requirements for a cross-border investment.

Chapter 2.2 extended the OFDI research by discussing the contemporary work of emerging OFDI theory authors who argue that the established literature fails to explain the phenomenon of OFDI from developing countries directed at developed countries. It was found that the motivational factors of MNEs from developing countries differ fundamentally in that they do not acquire foreign target companies to better capitalise on their own existing competitive advantages, but specifically seek out those target companies in the possession of such advantages. Thus, emerging theories of OFDI strongly acknowledge that not only physical assets are central to MNEs from developing countries but especially intangibles such as know-how and processes. Moghaddam et al. contributed with their evolution of Dunning's original typology of OFDI methods to a new value chain-based perspective which dramatically improves accuracy when it comes to the categorisation of OFDI from emerging country MNEs. Categories such as geopolitical influence-seeking OFDI further redefined the perception of MNEs from being merely rent-seeking to actively fostering improvement in the host countries, too.

Next in chapter 2.3, the demarcation of OFDI from other foreign market entry modes showed that their constituting feature is the equity required to purchase a wholly-owned subsidiary (100% of shares) or a partially-owned affiliate (>50 to <100%) respectively. In this context it transpired that OFDIs from developed to emerging

economies to a large extent are made up of greenfield investments, whereas the majority of the reverse OFDI flow (emerging to developed countries) constitutes of M&As. Chapter 2.4 identified NTBs and TBTs to be an important factor for the attractiveness of OFDI in general, because they present a way of circumventing the costs arising when goods or services are sold in a market located outside their country of origin.

Regarding the historic development of global FDI, chapter 2.5 identified two distinct eras. The first one was marked by extensive world trade liberalisation efforts and lasted from the early 1960s to the late 1980s. During this time newly founded organisations like the UNCTAD especially focused on abolishing business practices of MNEs with adverse effects on host country economies. This early phase of FDI growth was characterised mainly by North-North or North-South capital flows because MNEs were almost exclusively concentrated in the developed world. With the second era of FDI development this changed dramatically due to the emergence of developing countries onto the global investment stage. This was triggered by numerous events which created a very FDI-friendly environment, such as the establishment of the EU's SEM and the WTO with GATS, as well as the collapse of the Soviet Union and the economic opening of China. FDI had become a pillar of global economic growth and the emerging countries' contribution was ever increasing.

The focus in chapter 2.6 shifted towards FDI flows between China and Germany. First of all, the analysis of German companies performing OFDI in China showed that, despite the earlier existence of special economic zones, the legal framework did not allow foreign capital to enter the country prior to the mid-1990s. The Chinese government has been trying to keep control over foreign companies doing business within its borders through a dualistic system that puts the latter at a disadvantage compared to domestic investors. Even though the so-called Catalogue has been updated continuously and forced JVs have been gradually reduced, the legislature for direct investors remains a multi-layered network of different laws. However, it was found that the promising business opportunities attract German investors into the country in spite of the illiberal treatment. Chinese OFDI targeted at Germany on the other hand is hardly regulated at all as the second part of the chapter established. While in its early years at the beginning of the 2000s Chinese direct investors in Germany were still a rare phenomenon, especially from 2014 onwards the case

numbers have risen immensely. As the later descriptive analysis displayed, a not insignificant number of Chinese MNEs that acquire German target companies are SOEs which means that they oftentimes represent state interests. In combination with the fear of losing know-how in crucial industries to Chinese competitors the calls for a higher level of protectionism has become louder on both EU and national German levels. When the IFDI restrictiveness indices of China and Germany were directly compared, the analysis revealed that, despite China's continuous liberalisation efforts, the obstacles for German OFDI in China are disproportionally higher than those for Chinese OFDI in Germany.

In chapter 3 the perspective changed to that of the host country at which the foreign capital is targeted. It was found in chapter 3.1.1 that in general IFDI is incentivised by governments in order to boost the respective country's economy. The quantification of such IFDI can be done with the help of HCEs which are measured at a macro-economic level. Four different types of HCEs were identified namely resource-transferring, employment-affecting, BOP-affecting, and competition and economic growth-affecting ones, however, a lack of research into the HCE creation in FDI transactions from developing to developed countries was established. Thus, chapter 3.1.2 conducted a literature research which found that the most common externality comes in the form of liquidity insurance for German target companies that in turn enable investments into R&D or expansionary measures.

The concept of AC was introduced in chapter 3.2.1 as a source of competitive advantage from the acquisition, assimilation, transformation and exploitation of external knowledge. Its measurement was found to be a task that in the literature is usually circumvented through the usage of proxies in the form of qualitative approaches such as surveys. The following chapter 3.2.2 explained that the AC of IFDI-receiving target companies in developing countries is commonly known to come in the form of e.g. new technologies and/or processes. However, the reverse case of those located in developed countries and acquired by emerging MNEs was found to be an almost uncharted research subject. The need to develop AC measures capturing how well German target companies transform the liquidity they receive from their Chinese owners into increased sales and R&D advancements was identified for the following analysis.

Chapter 4 first of all laid out the requirements for the statistical success-predicting model the development of which was established as the main goal of this thesis. This resulted in the decision to carry out two LDAs with two sets of predictor variables. Before the analysis itself was introduced, chapter 4.1.2 outlined the set of past Sino-German OFDI cases which were included in the analysis in order to draw conclusions on which target companies' characteristics lead to a positive or a negative development after the acquisition. A total of 35 valid cases could be collected from the databases of the UR and DPMA. Their values constitute the variables used in the LDAs explained in chapter 4.1.3. The dependent variable was defined as the success measure and contained three separate financial figures, namely sales, F/A, and number of employees, which together led to the creation of the HCE index. The variables of the HCE index were all transformed to have ordinal or nominal measurement levels with the help of a scoring-based normalisation approach. The total score of all three HCE index variables was then recoded into a four-category ordinal variable which also introduced a traffic light colour system in order to distinguish between the final recommendations with respect to the analysed OFDI transaction. Next followed the description of the independent variables. With respect to general features for LDA1 first of all the descriptive analysis provided an understanding of the characteristics of the existing cases in the dataset as well as the different categories implanted to classify each of the five variables. Furthermore, for the measurement of target companies' ACs, the variables patents per employee and F/A turnover ratio were developed under consideration of the previous findings of chapter 3.2.2. Just like the variables of the HCE index, the two AC measures were defined to be time period-based so that their average changes are used to determine a positive or negative development.

The first of the two LDAs was conducted in chapter 4.2.1 and after the meeting of the required assumptions had been assured, it showed that the variables stake in target company as well as ownership structure of investor decreased the overall discriminatory power of the model. Thus, in a second conduction of LDA1 they were omitted and the model dramatically improved in terms of significance to classify cases into the four groups of the HCE index. As for LDA2, the variable patents per employees (AC1) performed poorly but the omission was rejected due to the loss of information value it would lead to as well as the non-presence of improved results. After all, the overall performance of LDA2 was established to be good with no

optimisation potentials existing. The results of the two LDAs were further analysed in chapter 4.2.3 in which those characteristics that have high impact on the predicted group belongingness were identified. It showed that a poor performance of German target companies after acquisition is closely linked to the characteristics small employee number, metals industry, and East of Germany location. A very good performance on the other hand was attributed to the characteristics high AC2 (F/A turnover ratio), North of Germany location, and automotive industry.

After the successful carrying out of the two LDAs, chapter 4.3.1 examined the prediction accuracy of the models with the help of reclassification of three cases from the dataset. Three randomly chosen cases of which the true group belongingness was known were categorised with the models' classification functions. It was found that two out of three cases were correctly grouped so that the model could be determined to be fit for the further prediction of new cases.

In order to simplify the application of the success prediction with the help of the developed LDAs, chapter 4.3.2.1 presented the Microsoft Excel-based solution which enables users to input the values of all five independent variables of LDA1 and LDA2 into a dashboard interface. Subsequently, chapter 4.3.2.2 exemplarily carried out a success prediction using the dashboard for the new case of the German energy company *SolarWorld AG*. The result showed that an acquisition by a Chinese OFDI investor could be fully recommended.

In chapter 1.1 the initial research questions of this thesis were formulated and the first one can be answered with the help of the findings of chapter 4.2.3. It was established that acquisitions by Chinese investors can be least recommended for German target companies which are small-sized metal-processing firms located in the East of Germany. Acquisitions can be recommended the most if the target company is an automotive firm located in the North of Germany with a high F/A turnover ratio (AC2).

The second research question can be answered with the help of the statistical model development of chapter 4. With the help of two LDAs a success-predicting dashboard was created which incorporates both the concept of HCE and AC. By basing the prediction aspect on existing past cases with a known outcome, the statistical significance of the analyses could be established. The prediction of new cases' success prospects is therefore reliable enough for the final recommendation of the dashboard to act as a decision-supporting instrument in the negotiation process

leading up to an OFDI. Therefore, the research question can be answered affirmatively.

5.2 Critical acclaim

This chapter has the intention of raising awareness for some issues and drawbacks of this thesis and its statistical model. A point that was already made before is the nature of FDI transactions which makes any prediction attempt a very challenging endeavour. Due to the multitude of influencing factors it will never be possible to predict the outcome of FDI to a completely reliable degree. Two almost identical target companies purchased by two almost identical MNEs at the exact same point in time could still develop into two completely different directions HCE index-wise due to unforeseeable circumstances. To a certain degree, this is simply owed to the basic risk of conducting business in an ever more volatile and global business environment. There simply cannot be a *100% informed* decision when it comes to FDI. However, the next best thing is a decision that is *as informed as possible* and it is within this mind-set where this thesis' starting point is located. When applied with the right expectations the developed success-predicting model can provide decision-making support within its field of application, i.e. for the prediction of future Sino-German FDI transactions. The result of the model for any case can never be the sole basis for an investment decision, however, it can support other instruments' results or challenge them and contribute to a more in-depth discussion of FDI.

Another reason why the model can only provide tendencies instead of definite statements lies within its limitations regarding sample size. With the success-predicting model based upon 35 valid cases no representative results can be produced. The reason for the small sample size lies in the limited access to partially sensitive data in combination with the nature of the underlying model. As soon as one value from a dataset is missing it is rendered invalid and replacement is no option since prediction based on non-real-world data would unjustifiably distort the significance of the results. This also leads to the practical limitation in the dashboard that for the independent variable industry only a total of seven different ones can be selected for the new case. While these seven categories do a good job in covering most major manufacturing industries in Germany, there will always be a case in which the company desired to be predicted belongs to another industry. Here, the model unfortunately is not applicable since there are no past cases of the missing industry within the dataset which means that no prediction is possible. Directly related to both

the challenges in FDI prediction as well as the small dataset are the compromises that had to be made during the development of the two LDAs. As was mentioned at that point already, the limited amount of cases to base the LDAs upon translates into lower significance and prediction power of the model. In general, all of the mentioned drawbacks could be resolved with the building of a larger size dataset.

In terms of the two introduced AC measures (patents per employee and F/A turnover ratio), it was already mentioned that the quantification of a company's ability to absorb and utilise external input is generally a difficult venture. It can only be done with the help of proxies which use alternative measures to infer conclusions on the AC. Therefore, the developed AC measures are vulnerable to external impacts rooting in the key figures they are based upon. An example of this regards the F/A turnover ratio (AC2) and its underlying definition of fixed assets which can vary from company to company. Next to buildings, machinery or vehicle fleet F/As can also be interpreted to include intangibles such as patents or trademarks. The success-predicting model is therefore dependent on uniform data which is in accordance to that used within its dataset, while deviating data can distort the results.

However, when considering these limitations and the thus due amount of care during the application of the success-prediction model, it can constitute an invaluable assessment tool through the easiness with which the experience of 35 past cases can be projected onto future OFDI transactions.

5.3 Outlook

The phenomenon of Chinese investors acquiring German companies was established to be a comparatively recent trend in chapter 2.6.2. Moreover, due to the rapid increase in cases a negative, invasion-like sentiment towards Chinese OFDI was found to have spread among the German public. The question addressed in this chapter is whether the number of acquisitions will continue to rise or if this trend will turn out to be non-sustainable.

Fears of a sellout of German know-how and competitive advantages have become more frequent than ever before at the time of writing of this thesis. This is despite the fact that it was found that most Chinese investors can be characterised by a long-term interest and expansionary strategies for their German affiliates. The current mood triggers calls for the introduction of regulatory bodies on EU but especially on national German level. As a matter of fact, this growing resistance, as of July/August

2017, seems to have first impacts on transaction numbers. After years of continuous growth the number of acquisitions in the first half of 2017 amounted to 25, down 10 compared to the same time period in 2016 (Köhler, 2017). This development is likely to be a sustainable one due to the fact that a major reason for the decrease is a new German regulation which enables the government to prohibit certain acquisitions that it deems to constitute “critical infrastructure” (Bauchmüller, 2017). This new rule only applies to non-EU investors and is considered to be a direct response to the highly disputed 2016 acquisition of the German robotics firm *KUKA AG* (ibid.). Additionally, negotiations regarding an EU-wide regulation are also currently being held. In reference to graph 4 this measure to a certain degree has converged the restrictiveness levels of Germany and China – but in a way free trade advocates do not approve of. Critics thus state that the new regulation is a step back towards a new era of protectionism (Pilz, 2017). Rather, instead of increasing the investment barriers on the German side, efforts should be put into negotiating trade liberalisation on the behalf of China. On the Chinese side this obvious political opposition against their business activities, which is now on top of the existing public hostility, has already noticeably confined their enthusiasm for German-targeted OFDI.

Due to the good reputation German manufacturing maintains in China, acquisitions can be expected to keep occurring, but their amount will most likely stabilise at an intermediate level leaving behind the boom years such as 2014-16. Until the EU has not implemented regulations for all of its member states, it can also be expected that Chinese investors evade the German jurisdiction by focusing their investments on companies in the UK, France or other EU countries.

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VII. Appendix

Table of contents

	A	B	C	D
1	***Chinese Outward-FDI in Germany (all monetary units in EUR)***			
2				
3				
4		**Chinese investor:**	**Former name (if applicable):**	**German target company:**
5	1	Sanhua Holding Group Co., Ltd.	Aweco GmbH	Sanhua AWECO Appliance Systems GmbH
6	2	Sinoma International Engineering Co., Ltd.		HAZEMAG & EPR GmbH
7	3	China Railway Group Limited	Aker Wirth GmbH	MHWirth GmbH
8	4	Shang Gong Group Co., Ltd		Dürkopp Adler AG
9	5	Impro Precision Industries Limited	Buderus Feinguss GmbH	BFG Feinguss Niederrhein GmbH
10	6	Mansfelder Metals Ltd.	AWP Aluminium Walzprodukte GmbH	MAW Mansfelder Aluminiumwerke
11	7	China Minmetals Corporation		HPTec GmbH
12	8	AVIC International Holding Corp		KHD Humboldt Wedag International AG
13	9	Dutech Holdings Ltd.		Format Tresorbau GmbH & Co. KG
14	10	Wafangdian Bearing Group Corp		KRW Leipzig GmbH
15	11	Lenovo		Medion AG
16	12	North Lingyun Industrial Group Co., Ltd.		Kiekert AG
17	13	Yan Siyou		Wumag Texroll GmbH & Co. KG
18	14	Hangzhou Meikai Group		Schumag AG
19	15	Zhejiang Longsheng Group Co., Ltd.		DyStar Colours Distribution GmbH
20	16	Fosun International Ltd.	Tom Tailor Holding AG	Tom Tailor Holding SE
21	17	Hanergy Holding Group, Ltd.		Solibro GmbH
22	18	Harbin Measuring & Cutting Tool Group	Kelch GmbH	Kelch & Links GmbH
23	19	XCMG Construction Machinery Co., Ltd.		Schwing GmbH
24	20	XCMG Construction Machinery Co., Ltd.		Fluitronics GmbH
25	21	Sany Group		Putzmeister Holding GmbH
26	22	Weichai Power Co., Ltd.		Kion Group AG
27	23	Zoomlion Heavy Industry Science and Technology Co., Ltd.		M-tec Mathis Technik GmbH
28	24	CHTC Fong's Industries Co., Ltd.		A. Monforts Textilmaschinen GmbH & Co. KG
29	25	Wolong Electric Group Co., Ltd.	Schorch Elektrische Maschinen und Antriebe GmbH	ATB Schorch GmbH
30	26	Eastern Sea International Holding Group Co., Ltd.		Gölz GmbH
31	27	Wuhan Iron and Steel Co Ltd (WISCO)	ThyssenKrupp Tailored Blanks	Wisco Tailored Blanks GmbH
32	28	Donghua Chain Group Co., Ltd.	Köbo GmbH & Co. KG	Köbo-Donghua GmbH & Co. KG
33	29	AVIC International Holding Corp	Thielert Aircraft Engines	Technify Motors GmbH
34	30	Zhuzhou Times New Material Technology Co., Ltd.	ZF Friedrichshafen AG	Boge Rubber & Plastics Group
35	31	Shang Gong Group Co., Ltd.		PFAFF Industriesysteme und Maschinen GmbH
36	32	China International Marine Container Co., Ltd.		TGE Gas Engineering GmbH
37	33	Neusoft Corporation	Harman Becker Automotive Systems GmbH	Neusoft Technology Solutions GmbH
38	34	Ningbo Joyson Electronic Corp.		Preh Holding GmbH
39	35	Hytera Communications Co., Ltd.	Rohde & Schwarz Professional Mobile Radio GmbH	Hytera Mobilfunk GmbH

A.2: Dataset table part 2

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1															
2	Independent variable (LDA1): general features							Independent variable (LDA2): required data for calculation							
3	General information							Annual net depreciation				Patents (based on DPMA)			
4	Initial stake:	Industry:	Fed State	Region	SOE vs. Priv	Size empl	Year:	Depr TO yr	Depr +1	Depr +2	Depr +3	Pat TO yr	Pat +1	Pat +2	Pat +3
5	100%	Electronics	Baden-Wuerttemberg	South	Private	<=100	2013	5,095,555	2,322,724	2,308,523		1	2	1	3
6	100%	Machinery	North Rhine-Westphalia	West	SOE	101-500	2013	1,174,000	1,642,123	1,824,355		1	0	0	
7	100%	Machinery	North Rhine-Westphalia	West	SOE	501-1000	2013	2,929,319	3,444,480	4,358,669		6	6	0	
8	100%	Machinery	North Rhine-Westphalia	West	SOE	1001-2000	2005	6,200,000	6,000,000	6,510,000	6,166,000	16	11	21	20
9	100%	Metals	North Rhine-Westphalia	West	Private	<=100	2013	121,339	188,674	233,467		0	0	0	0
10	100%	Metals	Saxony-Anhalt	East	Private	<=100	2005	64,867	98,785	75,358	58,575	0	1	0	1
11	100%	Machinery	Baden-Wuerttemberg	South	SOE	<=100	2008	926,826	675,528	517,117	387,944	0	0	0	0
12	89.02%	Machinery	North Rhine-Westphalia	West	SOE	501-1000	2014	12,789,000	14,571,000	17,756,000		23	9	1	0
13	100%	Machinery	Hesse	West	Private	101-500	2011	1,758,348	544,890	459,479	335,942	0	0	0	0
14	100%	Machinery	Saxony	East	Private	101-500	2013	2,265,445	2,247,154	1,940,348		0	0	0	0
15	75%	Electronics	North Rhine-Westphalia	West	Private	1001-2000	2011	3,598,000	3,683,000	3,623,000	3,094,000	1	1	0	1
16	100%	Automotive	North Rhine-Westphalia	West	Private	501-1000	2012	4,896,795	4,351,227	3,706,474	4,048,120	30	28	66	40
17	100%	Machinery	North Rhine-Westphalia	West	Private	<=100	2012	240,422	215,239	198,861		0	0	0	0
18	100%	Automotive	North Rhine-Westphalia	West	Private	101-500	2014	1,523,733	1,302,870	1,256,121		0	0	0	0
19	100%	Chemicals	Hesse	West	Private	101-500	2011	712,736	551,791	843,319	1,331,814	3	0	3	4
20	23.16%	Textiles	Hamburg	North	Private	>2000	2014	225,017,000	370,967,000	420,448,000		0	0	0	0
21	100%	Energy	Saxony-Anhalt	East	Private	101-500	2012	5,717,725	5,693,897	5,619,704	5,285,313	1	0	3	5
22	100%	Machinery	Baden-Wuerttemberg	South	SOE	101-500	2005	860,163	844,511	658,868	761,939	0	2	0	0
23	100%	Machinery	North Rhine-Westphalia	West	SOE	501-1000	2012	1,085,311	952,072	1,307,324	1,675,672	1	9	9	6
24	100%	Machinery	North Rhine-Westphalia	West	SOE	<=100	2011	252,800	246,226	250,010	338,882	0	1	0	0
25	100%	Machinery	Baden-Wuerttemberg	South	Private	1001-2000	2012	14,195,991	15,550,086	15,984,365	19,249,000	27	29	29	3
26	25%	Machinery	Hesse	West	SOE	>2000	2012	77,200,000	67,800,000	150,300,000	164,200,000	6	5	6	2
27	100%	Machinery	Baden-Wuerttemberg	South	SOE	101-500	2013	332,549	216,870	296,610		1	1	2	
28	100%	Machinery	North Rhine-Westphalia	West	Private	<=100	2012	109,600	127,586	168,282	233,488	0	2	0	1
29	100%	Machinery	North Rhine-Westphalia	West	Private	501-1000	2011	1,289,000	1,378,000	1,424,000	1,115,000	0	0	0	0
30	100%	Machinery	North Rhine-Westphalia	West	Private	<=100	2013	140,931	106,287	94,885		1	1	0	
31	100%	Metals	North Rhine-Westphalia	West	SOE	101-500	2013	8,251,000	11,097,423	4,936,000		1	2	1	
32	100%	Machinery	North Rhine-Westphalia	West	Private	101-500	2010	277,335	275,326	293,843	360,395	0	0	0	0
33	100%	Machinery	Saxony	East	SOE	101-500	2013	1,583,560	2,533,474	3,060,818		0	0	0	0
34	100%	Automotive	Lower Saxony	North	Private	1001-2000	2014	15,441,000	44,500,000	42,032,000		1	0	2	
35	100%	Machinery	Rhineland-Palatinate	West	SOE	101-500	2013	1,586,322	1,483,732	1,539,749		1	0	3	
36	100%	Machinery	North Rhine-Westphalia	West	Private	1001-2000	2008	532,024	527,627	411,442	396,974	1	6	4	0
37	100%	Automotive	Hamburg	North	Private	101-500	2010	418,947	739,878	785,389	959,623	0	0	0	1
38	74.9%	Automotive	Bavaria	South	Private	>2000	2011	21,177,000	25,510,000	28,836,000	32,050,000	15	10	8	25
39	100%	Electronics	Lower Saxony	North	Private	101-500	2012	1,126,103	885,845	727,827	1,113,330	0	0	0	0

	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1																
2									Dependent variable: HCE index							
3					Sales											
4	Sales TO yr	Δ	Sales +1	Δ	Sales +2	Δ	Sales +3	Δ	F/A TO yr	Δ	F/A +1	Δ	F/A +2	Δ	F/A +3	Δ
5	8,847,128	-12.2%	7,771,544	-34.5%	5,090,001			**-23.3%**	2,026,776	-5.4%	1,916,357	-7.2%	1,779,322			**-6.3%**
6	71,151,304	-11.7%	62,839,280	-23.1%	48,305,489			**-17.4%**	4,912,929	-8.8%	4,478,186	-8.7%	4,087,446			**-8.8%**
7	222,629,242	-14.0%	191,465,029	-34.4%	125,585,209			**-24.2%**	34,209,808	0.6%	34,417,057	-8.6%	31,469,170			**-4.0%**
8	128,571,000	13.6%	146,099,000	3.6%	151,303,000	-10.6%	135,295,000	**2.2%**	34,758,000	0.4%	34,893,000	-4.2%	33,417,000	-5.7%	31,511,000	**-3.2%**
9	10,841,201	-11.4%	9,607,126	-3.3%	9,291,059			**-7.3%**	2,892,870	5.0%	3,038,129	-7.0%	2,825,427			**-1.0%**
10	44,646,412	9.6%	48,916,058	-21.9%	38,184,549	-70.8%	11,135,092	**-27.7%**	274,323	19.1%	326,633	-17.5%	269,359	-19.4%	217,193	**-5.9%**
11	16,038,000	-26.1%	11,851,611	4.0%	12,322,022	-9.7%	11,125,932	**-10.6%**	1,845,489	-22.3%	1,433,209	-13.3%	1,242,416	-2.4%	1,212,940	**-12.7%**
12	240,190,000	-28.4%	172,074,000	-21.3%	135,431,000			**-24.8%**	3,937,000	0.2%	3,946,000	-1.0%	3,905,000			**-0.4%**
13	19,010,899	-3.2%	18,403,707	6.1%	19,527,502	26.7%	24,735,032	**9.9%**	3,073,927	-14.9%	2,615,206	-13.4%	2,263,747	-14.3%	1,940,261	**-14.2%**
14	19,462,269	2.1%	19,867,058	-2.0%	19,472,718			**0.0%**	9,316,649	-15.6%	7,867,603	-17.9%	6,460,135			**-16.7%**
15	1,423,848,000	15.1%	1,639,339,000	-34.8%	1,069,144,000	4.6%	1,118,515,000	**-5.0%**	28,324,000	-2.3%	27,682,000	-10.1%	24,899,000	-8.2%	22,854,000	**-6.8%**
16	132,305,775	-7.0%	123,027,579	-3.8%	118,389,588	-9.1%	107,621,770	**-6.6%**	15,375,532	-9.5%	13,915,273	-6.3%	13,036,010	9.5%	14,275,657	**-2.1%**
17	16,071,000	-4.9%	15,283,521	1.4%	15,500,000			**-1.7%**	1,726,519	-4.0%	1,658,319	-4.8%	1,579,287			**-4.4%**
18	49,232,174	1.3%	49,885,453	-9.3%	45,256,798			**-4.0%**	7,246,265	-2.7%	7,050,470	-1.9%	6,915,756			**-2.3%**
19	196,263,000	-15.3%	166,243,000	-5.3%	157,384,000	5.6%	166,227,000	**-5.0%**	1,776,000	9.4%	1,943,000	48.7%	2,890,000	20.0%	3,467,000	**26.0%**
20	932,132,000	2.5%	955,878,000	1.3%	968,519,000			**1.9%**	149,055,000	2.2%	152,328,000	-31.6%	104,221,000			**-14.7%**
21	9,938,032	-74.4%	2,539,347	296.5%	10,068,723	12.7%	11,343,647	**78.2%**	40,145,534	-13.1%	34,874,478	-14.5%	29,814,470	-16.6%	24,857,780	**-14.8%**
22	17,297,000	11.0%	19,200,000	9.1%	20,947,200	2.2%	21,412,841	**7.4%**	1,865,591	-32.8%	1,253,184	29.8%	1,626,065	-12.1%	1,428,632	**-5.1%**
23	166,540,193	9.3%	182,025,320	2.4%	186,433,525	23.6%	230,498,704	**11.8%**	4,134,814	-12.9%	3,603,458	-3.2%	3,487,925	-5.3%	3,302,418	**-7.1%**
24	18,818,514	-7.1%	17,481,334	2.5%	17,920,497	-7.5%	16,578,391	**-4.0%**	661,811	11.7%	739,003	-16.9%	614,455	-16.8%	511,416	**-7.3%**
25	675,465,709	-7.2%	626,796,620	10.3%	691,211,886	9.3%	755,413,000	**4.1%**	126,295,093	-3.3%	122,082,219	4.2%	127,166,449	12.9%	143,589,000	**4.6%**
26	4,726,700,000	-4.9%	4,494,600,000	4.1%	4,677,900,000	9.0%	5,097,000,000	**2.7%**	1,541,300,000	4.3%	1,607,900,000	0.7%	1,618,600,000	3.7%	1,678,700,000	**2.9%**
27	30,108,644	-22.8%	23,232,675	47.6%	34,291,319			**12.4%**	1,793,035	-0.5%	1,783,931	-3.2%	1,727,736			**-1.8%**
28	46,450,629	-7.6%	42,906,957	-5.8%	40,401,685	20.1%	48,521,289	**2.2%**	243,261	352.4%	1,100,631	18.4%	1,302,918	-11.8%	1,149,646	**119.7%**
29	74,969,000	-10.0%	67,443,000	9.9%	74,134,000	3.0%	76,333,000	**0.9%**	9,645,000	1.0%	9,746,000	-3.4%	9,410,000	13.8%	10,705,000	**3.8%**
30	3,717,150	8.3%	4,024,757	-5.4%	3,806,558			**1.4%**	195,528	-27.8%	141,164	54.5%	218,082			**13.3%**
31	148,131,000	-12.3%	129,983,000	4.2%	135,384,000			**-4.0%**	34,991,000	36.7%	47,844,000	-3.8%	46,024,000			**16.5%**
32	12,617,215	10.0%	13,877,314	-3.3%	13,414,523	2.2%	13,708,910	**2.9%**	2,078,680	-2.6%	2,025,635	2.4%	2,074,322	40.4%	2,912,463	**13.4%**
33	6,905,877	178.1%	19,208,596	3.7%	19,912,431			**90.9%**	9,185,756	-15.3%	7,781,280	0.1%	7,790,180			**-7.6%**
34	228,594,000	223.6%	739,657,000	3.2%	763,375,000			**113.4%**	173,074,000	11.6%	193,224,000	6.5%	205,816,000			**9.1%**
35	24,382,404	7.1%	26,104,236	69.8%	44,312,863			**38.4%**	1,942,756	-21.9%	1,517,242	36.2%	2,066,843			**7.2%**
36	11,017,244	696.7%	87,778,718	-82.1%	15,729,984	-91.2%	1,386,020	**174.5%**	931,354	3.9%	967,260	-1.0%	957,304	4.2%	997,770	**2.4%**
37	8,903,670	110.8%	18,769,072	28.2%	24,056,501	8.9%	26,206,760	**49.3%**	2,493,157	-10.1%	2,241,491	0.4%	2,249,757	-13.2%	1,953,371	**-7.6%**
38	412,118,000	12.2%	462,270,000	12.5%	520,267,000	17.5%	611,057,000	**14.1%**	85,706,000	6.4%	91,226,000	5.5%	96,273,000	28.2%	123,461,000	**13.4%**
39	29,065,812	2.3%	29,722,410	18.2%	35,122,141	-5.7%	33,129,758	**4.9%**	2,595,119	-14.1%	2,228,746	21.7%	2,713,397	144.1%	6,622,239	**50.6%**

A.4: Dataset table part 4

	AJ	AK	AL	AM	AN	AO	AP	AQ
1								
2	Dependent variable: HCE index							
3								
4	**Empl TO yr Δ**		**Empl +1 Δ**		**Empl +2 Δ**		**Empl +3 Δ**	
5	116	*-73.3%*	31	*-3.2%*	30			***-38.3%***
6	280	*-23.9%*	213	*-8.9%*	194			***-16.4%***
7	723	*-0.8%*	717	*-10.6%*	641			***-5.7%***
8	1,805	*-2.9%*	1,753	*1.8%*	1,785	*-5.3%*	1,691	***-2.1%***
9	86	*-2.3%*	84	*-16.7%*	70			***-9.5%***
10	70	*4.3%*	73	*4.1%*	76	*-3.9%*	73	***1.5%***
11	77	*2.6%*	79	*-7.6%*	73	*-4.1%*	70	***-3.0%***
12	777	*-5.4%*	735	*-3.8%*	707			***-4.6%***
13	176	*-14.8%*	150	*-8.7%*	137	*7.3%*	147	***-5.4%***
14	200	*1.0%*	202	*-1.5%*	199			***-0.2%***
15	1,013	*1.6%*	1,029	*-2.1%*	1,007	*-1.9%*	988	***-0.8%***
16	973	*-1.8%*	955	*-4.2%*	915	*-0.9%*	907	***-2.3%***
17	88	*8.0%*	95	*-12.6%*	83			***-2.3%***
18	492	*-1.2%*	486	*-3.3%*	470			***-2.3%***
19	477	*-46.3%*	256	*-12.9%*	223	*-3.1%*	216	***-20.8%***
20	6,443	*8.4%*	6,981	*-2.8%*	6,789			***2.8%***
21	377	*-1.6%*	371	*-26.4%*	273	*-2.6%*	266	***-10.2%***
22	170	*14.7%*	195	*0.0%*	195	*-15.4%*	165	***-0.2%***
23	556	*8.3%*	602	*-6.8%*	561	*-2.0%*	550	***-0.2%***
24	67	*23.9%*	83	*1.2%*	84	*-4.8%*	80	***6.8%***
25	1,303	*-7.3%*	1,208	*3.8%*	1,254	*1.8%*	1,277	***-0.5%***
26	8,497	*-10.3%*	7,625	*6.7%*	8,139	*3.1%*	8,395	***-0.1%***
27	126	*3.2%*	130	*-6.2%*	122			***-1.5%***
28	113	*-13.3%*	98	*-19.4%*	79	*3.8%*	82	***-9.6%***
29	496	*1.0%*	501	*0.6%*	504	*8.7%*	548	***3.4%***
30	51	*-2.0%*	50	*0.0%*	50			***-1.0%***
31	261	*1.1%*	264	*1.1%*	267			***1.1%***
32	169	*4.7%*	177	*1.1%*	179	*0.6%*	180	***2.1%***
33	192	*-1.0%*	190	*1.6%*	193			***0.3%***
34	1,723	*0.7%*	1,735	*0.8%*	1,749			***0.8%***
35	200	*5.0%*	210	*2.4%*	215			***3.7%***
36	112	*15.2%*	129	*-5.4%*	122	*10.7%*	135	***6.8%***
37	118	*44.1%*	170	*20.6%*	205	*0.5%*	206	***21.7%***
38	2,629	*15.7%*	3,043	*9.5%*	3,332	*13.3%*	3,775	***12.8%***
39	123	*25.2%*	154	*5.2%*	162	*8.0%*	175	***12.8%***

	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE	BF	BG
1																
2	Independent variable (LDA2): AC measures															
3	AC1 (Patents/employees)								AC2 (Sales/F/A-net depreciation) F/A Turnover Ratio							
4	AC1 TO yr	Δ	AC1 +1	Δ	AC1 +2	Δ	AC1 +3	Δ	AC2 TO yr	Δ	AC2 +1	Δ	AC2 +2	Δ	AC2 +3	Δ
5	0.862069	*5.59*	6.45161	*-3.12*	3.33333			***1.23563***	-2.88295	*563.4%*	-19.1244	*-49.7%*	-9.61828			***256.8%***
6	0.357143	*-0.36*	0	*0.00*	0			***-0.1786***	19.02986	*16.4%*	22.1572	*-3.7%*	21.3449			***6.4%***
7	0.829876	*0.01*	0.83682	*-0.84*	0			***-0.4149***	7.117192	*-13.1%*	6.18176	*-25.1%*	4.63235			***-19.1%***
8	0.886427	*-0.26*	0.6275	*0.55*	1.17647	*0.01*	1.18273	***0.09877***	4.502101	*12.3%*	5.05655	*11.2%*	5.62318	*-5.1%*	5.33813	***6.2%***
9	0	*0.00*	0	*0.00*	0			***0***	3.911629	*-13.8%*	3.37157	*6.3%*	3.58457			***-3.7%***
10	0	*1.37*	1.36986	*-1.37*	0	*1.37*	1.36986	***0.45662***	213.1541	*0.7%*	214.687	*-8.3%*	196.827	*-64.3%*	70.2007	***-24.0%***
11	0	*0.00*	0	*0.00*	0	*0.00*	0	***0***	17.45798	*-10.4%*	15.642	*8.6%*	16.9889	*-20.6%*	13.486	***-7.5%***
12	2.960103	*-1.74*	1.22449	*-1.08*	0.14144			***-1.4093***	-27.134	*-40.3%*	-16.1952	*-39.6%*	-9.77771			***-40.0%***
13	0	*0.00*	0	*0.00*	0	*0.00*	0	***0***	14.45059	*-38.5%*	8.88932	*21.8%*	10.8229	*42.5%*	15.4178	***8.6%***
14	0	*0.00*	0	*0.00*	0			***0***	2.760134	*28.1%*	3.53478	*21.9%*	4.30833			***25.0%***
15	0.098717	*0.00*	0.09718	*-0.10*	0	*0.10*	0.10121	***0.00083***	57.58505	*18.6%*	68.3086	*-26.4%*	50.2512	*12.6%*	56.605	***1.6%***
16	3.083248	*-0.15*	2.93194	*4.28*	7.21311	*-2.80*	4.41014	***0.4423***	12.62612	*1.9%*	12.8635	*-1.4%*	12.6898	*-17.1%*	10.5227	***-5.5%***
17	0	*0.00*	0	*0.00*	0			***0***	10.81423	*-2.1%*	10.5909	*6.0%*	11.2284			***2.0%***
18	0	*0.00*	0	*0.00*	0			***0***	8.603215	*0.9%*	8.67935	*-7.9%*	7.99642			***-3.5%***
19	0.628931	*-0.63*	0	*1.35*	1.34529	*0.51*	1.85185	***0.40764***	184.5854	*-35.3%*	119.495	*-35.6%*	76.8972	*1.2%*	77.8513	***-23.2%***
20	0	*0.00*	0	*0.00*	0			***0***	-12.271	*-64.4%*	-4.37195	*-29.9%*	-3.06273			***-47.2%***
21	0.265252	*-0.27*	0	*1.10*	1.0989	*0.78*	1.8797	***0.53815***	0.288663	*-69.9%*	0.08702	*378.2%*	0.41615	*39.3%*	0.57957	***115.9%***
22	0	*1.03*	1.02564	*-1.03*	0	*0.00*	0	***0***	17.20362	*173.1%*	46.9813	*-53.9%*	21.6576	*48.3%*	32.118	***55.8%***
23	0.179856	*1.32*	1.49502	*0.11*	1.60428	*-0.51*	1.09091	***0.30368***	54.61224	*25.7%*	68.6529	*24.5%*	85.4964	*65.7%*	141.693	***38.7%***
24	0	*1.20*	1.20482	*-1.20*	0	*0.00*	0	***0***	46.0098	*-22.9%*	35.4751	*38.6%*	49.172	*95.4%*	96.0877	***37.0%***
25	2.072141	*0.33*	2.40066	*-0.09*	2.3126	*-2.08*	0.23493	***-0.6124***	6.025612	*-2.4%*	5.88364	*5.7%*	6.21694	*-2.3%*	6.07538	***0.3%***
26	0.070613	*-0.01*	0.06557	*0.01*	0.07372	*-0.05*	0.02382	***-0.0156***	3.2284	*-9.6%*	2.91838	*9.2%*	3.18593	*5.6%*	3.36547	***1.7%***
27	0.793651	*-0.02*	0.76923	*0.87*	1.63934			***0.42285***	20.6155	*-28.1%*	14.8256	*61.6%*	23.9611			***16.8%***
28	0	*2.04*	2.04082	*-2.04*	0	*1.22*	1.21951	***0.4065***	347.5257	*-87.3%*	44.0956	*-19.2%*	35.6076	*48.7%*	52.9617	***-19.3%***
29	0	*0.00*	0	*0.00*	0	*0.00*	0	***0***	8.971876	*-10.2%*	8.05963	*15.2%*	9.283	*-14.3%*	7.95965	***-3.1%***
30	1.960784	*0.04*	2	*-2.00*	0			***-0.9804***	68.08341	*69.5%*	115.399	*-73.2%*	30.8981			***-1.9%***
31	0.383142	*0.37*	0.75758	*-0.38*	0.37453			***-0.0043***	5.539678	*-36.1%*	3.53728	*-6.9%*	3.29498			***-21.5%***
32	0	*0.00*	0	*0.00*	0	*0.00*	0	***0***	7.00433	*13.2%*	7.92849	*-5.0%*	7.53422	*-28.7%*	5.37169	***-6.8%***
33	0	*0.00*	0	*0.00*	0			***0***	0.908406	*302.9%*	3.66031	*15.0%*	4.21038			***159.0%***
34	0.058038	*-0.06*	0	*0.11*	0.11435			***0.02816***	1.450166	*243.0%*	4.97335	*-6.3%*	4.66086			***118.3%***
35	0.5	*-0.50*	0	*1.40*	1.39535			***0.44767***	68.4065	*1038.8%*	778.998	*-89.2%*	84.0701			***474.8%***
36	0.892857	*3.76*	4.65116	*-1.37*	3.27869	*-3.28*	0	***-0.2976***	27.58932	*623.7%*	199.664	*-85.6%*	28.8168	*-92.0%*	2.30697	***148.7%***
37	0	*0.00*	0	*0.00*	0	*0.49*	0.48544	***0.16181***	4.29256	*191.2%*	12.4993	*31.4%*	16.4279	*60.5%*	26.3716	***94.4%***
38	0.570559	*-0.24*	0.32862	*-0.09*	0.2401	*0.42*	0.66225	***0.03056***	6.386555	*10.1%*	7.03436	*9.7%*	7.71486	*-13.4%*	6.68472	***2.2%***
39	0	*0.00*	0	*0.00*	0	*0.00*	0	***0***	19.78591	*11.9%*	22.133	*-20.1%*	17.6887	*-66.0%*	6.01385	***-24.7%***

A.6: Data normalisation table

				Dependent variable: HCE index								*Independent variables: AC1+2*		
	Chinese investor:	**German target company:**	**Δ Sales**	**Score**	**Δ F/A**	**Score**	**Δ Empl.**	**Score**	**HCE score**	**Δ AC1**	**Score**	**Δ AC2**	**Score**
1	Sanhua Holding Group Co., Ltd.	Sanhua AWECO Appliance Systems Gm	-23.33%	3	-6.30%	8	-38.25%	0	11	1.24	20	256.83%	20
2	Sinoma International Engineering Co., Lt	HAZEMAG & EPR GmbH	-17.41%	5	-8.79%	7	-16.42%	0	12	-0.18	5	6.38%	10
3	China Railway Group Limited	MHWirth GmbH	-24.20%	3	-3.98%	9	-5.71%	7	19	-0.41	1	-19.10%	8
4	Impro Precision Industries Limited	BFG Feinguss Niederrhein GmbH	-7.34%	7	-0.99%	10	-9.50%	4	21	0.00	8	-3.74%	9
5	China Minmetals Corporation	HPTec GmbH	-10.61%	7	-12.67%	6	-3.04%	9	22	0.00	8	-7.47%	9
6	Mansfelder Metals Ltd.	MAW Mansfelder Aluminiumwerke	-27.74%	2	-5.94%	8	1.48%	12	22	0.46	15	-23.98%	7
7	AVIC International Holding Corp	KHD Humboldt Wedag International AG	-24.83%	3	-0.41%	11	-4.61%	8	22	-1.41	0	-39.97%	6
8	Dutech Holdings Ltd.	Format Tresorbau GmbH & Co. KG	9.86%	12	-14.22%	5	-5.38%	7	24	0.00	8	8.57%	10
9	Wafangdian Bearing Group Corp	KRW Leipzig GmbH	0.05%	9	-16.72%	4	-0.24%	11	24	0.00	8	24.97%	11
10	Lenovo	Medion AG	-5.01%	8	-6.84%	8	-0.82%	10	26	0.00	8	1.61%	9
11	Yan Siyou	Wumag Texroll GmbH & Co. KG	-1.74%	9	-4.36%	9	-2.34%	9	27	0.00	8	1.98%	9
12	Hangzhou Meikai Group	Schumag AG	-3.98%	8	-2.31%	10	-2.26%	9	27	0.00	8	-3.49%	9
13	North Lingyun Industrial Group Co., Ltd.	Kiekert AG	-6.63%	8	-2.10%	10	-2.30%	9	27	0.44	15	-5.52%	9
14	Shang Gong Group Co., Ltd	Dürkopp Adler AG	2.20%	10	-3.18%	9	-2.11%	9	28	0.10	9	-25.46%	7
15	Zhejiang Longsheng Group Co., Ltd.	DyStar Colours Distribution GmbH	-5.00%	8	26.04%	20	-20.79%	0	28	0.41	14	-23.22%	7
16	Fosun International Ltd.	Tom Tailor Holding SE	1.93%	10	-14.69%	5	2.80%	13	28	0.00	8	-47.16%	5
17	Hanergy Holding Group, Ltd.	Solibro GmbH	78.24%	20	-14.75%	5	-10.19%	4	29	0.54	16	115.88%	19
18	Harbin Measuring & Cutting Tool Group	Kelch & Links GmbH	7.44%	11	-5.07%	9	-0.23%	11	31	0.00	8	55.83%	14
19	XCMG Construction Machinery Co., Ltd.	Schwing GmbH	11.79%	12	-7.13%	8	-0.17%	11	31	0.30	12	38.66%	12
20	XCMG Construction Machinery Co., Ltd.	Fluitronics GmbH	-4.03%	8	-7.32%	8	6.77%	16	32	0.00	8	37.04%	12
21	Sany Group	Putzmeister Holding GmbH	4.12%	10	4.58%	12	-0.55%	10	32	-0.61	0	0.34%	9
22	Zoomlion Heavy Industry Science and Te	M-tec Mathis Technik GmbH	12.38%	13	-1.83%	10	-1.49%	10	33	0.42	14	16.77%	11
23	Weichai Power Co., Ltd.	Kion Group AG	2.71%	10	2.90%	12	-0.13%	11	33	-0.02	7	1.73%	9
24	CHTC Fong's Industries Co., Ltd.	A. Monforts Textilmaschinen GmbH & Co	2.21%	10	119.69%	20	-9.62%	4	34	0.41	14	-19.27%	8
25	Wolong Electric Group Co., Ltd.	ATB Schorch GmbH	0.95%	10	3.79%	12	3.45%	13	35	0.00	8	-3.08%	9
26	Eastern Sea International Holding Group	Gölz GmbH	1.43%	10	13.34%	16	-0.98%	10	36	-0.98	0	-1.86%	9
27	Wuhan Iron and Steel Co Ltd (WISCO)	Wisco Tailored Blanks GmbH	-4.05%	8	16.46%	17	1.14%	12	37	0.00	8	-21.50%	7
28	Donghua Chain Group Co., Ltd.	Köbo-Donghua GmbH & Co. KG	2.95%	10	13.42%	16	2.14%	12	38	0.00	8	-6.83%	9
29	AVIC International Holding Corp	Technify Motors GmbH	90.91%	20	-7.59%	8	0.27%	11	39	0.00	8	158.98%	20
30	Zhuzhou Times New Material Technology	Boge Rubber & Plastics Group	113.39%	20	9.08%	14	0.75%	11	45	0.03	8	118.33%	19
31	Shang Gong Group Co., Ltd.	PFAFF Industriesysteme und Maschinen	38.41%	19	7.16%	13	3.69%	14	46	0.45	15	474.79%	20
32	Neusoft Corporation	Neusoft Technology Solutions GmbH	49.30%	20	-7.63%	8	21.71%	20	48	0.16	10	94.38%	17
33	China International Marine Container Co.,	TGE Gas Engineering GmbH	174.49%	20	2.35%	12	6.80%	16	48	-0.30	3	148.71%	20
34	Ningbo Joyson Electronic Corp.	Preh Holding GmbH	14.06%	13	13.40%	16	12.85%	20	49	0.03	8	2.15%	9
35	Hytera Communications Co., Ltd.	Hytera Mobilfunk GmbH	4.92%	11	50.56%	20	12.81%	20	51	0.00	8	-24.74%	7

A.7: Within HCE index groups data deviation from pre-classification distribution table

DEPENDENT VARIABLE (HCE index)	INDEPENDENT VARIABLES																			
	LDA1												LDA2							
	Industry				Region				Company Size				AC1 (patents/employee)				AC2 (F/A turnover ratio)			
		Unclassified	In groups	Δ		Unclassified	In groups	Δ		Unclassified	In groups	Δ		Unclassified	In groups	Δ		Unclassified	In groups	Δ
Group 1 ("not recommended")	Machinery	60.00%	66.67%	***6.67***	North	11.43%	0.00%	***-11.43***	<=100	22.86%	44.44%	***21.58***	1	20.00%	33.33%	***13.33***	1	25.71%	33.33%	***7.62***
	Electronics	8.57%	11.11%	***2.54***	West	60.00%	55.56%	***-4.44***	101-500	40.00%	33.33%	***-6.67***	2	48.57%	44.44%	***-4.13***	2	34.29%	22.22%	***-12.06***
	Automotive	14.29%	0.00%	***-14.29***	East	11.43%	22.22%	***10.79***	501-1000	14.29%	22.22%	***7.93***	3	8.57%	0.00%	***-8.57***	3	17.14%	33.33%	***16.19***
	Metals	8.57%	22.22%	***13.65***	South	17.14%	22.22%	***5.08***	1001-2000	14.29%	0.00%	***-14.29***	4	22.86%	22.22%	***-0.63***	4	22.86%	11.11%	***-11.75***
	Chemicals	2.86%	0.00%	***-2.86***					>2000	8.57%	0.00%	***-8.57***								
	Textiles	2.86%	0.00%	***-2.86***																
	Energy	2.86%	0.00%	***-2.86***																
Group 2 ("rather not recommended")	Machinery	60.00%	33.33%	***-26.67***	North	11.43%	11.11%	***-0.32***	<=100	22.86%	11.11%	***-11.75***	1	20.00%	0.00%	***-20.00***	1	25.71%	33.33%	***7.62***
	Electronics	8.57%	11.11%	***2.54***	West	60.00%	66.67%	***6.67***	101-500	40.00%	44.44%	***4.44***	2	48.57%	44.44%	***-4.13***	2	34.29%	44.44%	***10.16***
	Automotive	14.29%	22.22%	***7.93***	East	11.43%	11.11%	***-0.32***	501-1000	14.29%	11.11%	***-3.18***	3	8.57%	22.22%	***13.65***	3	17.14%	11.11%	***-6.03***
	Metals	8.57%	0.00%	***-8.57***	South	17.14%	11.11%	***-6.03***	1001-2000	14.29%	22.22%	***7.93***	4	22.86%	33.33%	***10.48***	4	22.86%	11.11%	***-11.75***
	Chemicals	2.86%	11.11%	***8.25***					>2000	8.57%	11.11%	***2.54***								
	Textiles	2.86%	11.11%	***8.25***																
	Energy	2.86%	11.11%	***8.25***																
Group 3 ("rather recommended")	Machinery	60.00%	88.89%	***28.89***	North	11.43%	0.00%	***-11.43***	<=100	22.86%	33.33%	***10.47***	1	20.00%	33.33%	***13.33***	1	25.71%	22.22%	***-3.49***
	Electronics	8.57%	0.00%	***-8.57***	West	60.00%	66.67%	***6.67***	101-500	40.00%	22.22%	***-17.78***	2	48.57%	44.44%	***-4.13***	2	34.29%	44.44%	***10.16***
	Automotive	14.29%	0.00%	***-14.29***	East	11.43%	0.00%	***-11.43***	501-1000	14.29%	22.22%	***7.93***	3	8.57%	0.00%	***-8.57***	3	17.14%	22.22%	***5.08***
	Metals	8.57%	11.11%	***2.54***	South	17.14%	33.33%	***16.19***	1001-2000	14.29%	11.11%	***-3.18***	4	22.86%	22.22%	***-0.63***	4	22.86%	11.11%	***-11.75***
	Chemicals	2.86%	0.00%	***-2.86***					>2000	8.57%	11.11%	***2.54***								
	Textiles	2.86%	0.00%	***-2.86***																
	Energy	2.86%	0.00%	***-2.86***																
Group 4 ("fully recommended")	Machinery	60.00%	50.00%	***-10.00***	North	11.43%	37.50%	***26.07***	<=100	22.86%	0.00%	***-22.86***	1	20.00%	12.50%	***-7.50***	1	25.71%	12.50%	***-13.21***
	Electronics	8.57%	12.50%	***3.93***	West	60.00%	50.00%	***-10.00***	101-500	40.00%	62.50%	***22.50***	2	48.57%	62.50%	***13.93***	2	34.29%	25.00%	***-9.29***
	Automotive	14.29%	37.50%	***23.21***	East	11.43%	12.50%	***1.07***	501-1000	14.29%	0.00%	***-14.29***	3	8.57%	12.50%	***3.93***	3	17.14%	0.00%	***-17.14***
	Metals	8.57%	0.00%	***-8.57***	South	17.14%	0.00%	***-17.14***	1001-2000	14.29%	25.00%	***10.71***	4	22.86%	12.50%	***-10.36***	4	22.86%	62.50%	***39.64***
	Chemicals	2.86%	0.00%	***-2.86***					>2000	8.57%	12.50%	***3.93***								
	Textiles	2.86%	0.00%	***-2.86***																
	Energy	2.86%	0.00%	***-2.86***																

B.1: SPSS output LDA1 original table 1 (Processing summary)

Analysis Case Processing Summary

Unweighted Cases		N	Percent
Valid		35	100,0
Excluded	Missing or out-of-range group codes	0	,0
	At least one missing discriminating variable	0	,0
	Both missing or out-of-range group codes and at least one missing discriminating variable	0	,0
	Total	0	,0
Total		35	100,0

B.2: SPSS output LDA1 original table 2 (Group statistics part 1)

Group Statistics

HCE groups		Mean	Std. Deviation	Valid N (listwise)	
				Unweighted	Weighted
1	Stake in target company	3,89	,333	9	9,000
	Industry	1,78	1,302	9	9,000
	Region	2,67	,866	9	9,000
	Company size (no. of employees)	1,78	,833	9	9,000
	Ownership structure of investor	1,56	,527	9	9,000
2	Stake in target company	3,67	,707	9	9,000
	Industry	3,22	2,279	9	9,000
	Region	2,22	,833	9	9,000
	Company size (no. of employees)	2,78	1,302	9	9,000
	Ownership structure of investor	1,78	,441	9	9,000
3	Stake in target company	3,78	,667	9	9,000
	Industry	1,33	1,000	9	9,000
	Region	2,67	1,000	9	9,000
	Company size (no. of employees)	2,44	1,424	9	9,000
	Ownership structure of investor	1,44	,527	9	9,000

B.3: SPSS output LDA1 original table 3 (Group statistics part 2)

3	Stake in target company	3,78	,667	9	9,000
	Industry	1,33	1,000	9	9,000
	Region	2,67	1,000	9	9,000
	Company size (no. of employees)	2,44	1,424	9	9,000
	Ownership structure of investor	1,44	,527	9	9,000
4	Stake in target company	3,88	,354	8	8,000
	Industry	1,88	,991	8	8,000
	Region	1,75	,707	8	8,000
	Company size (no. of employees)	2,88	1,246	8	8,000
	Ownership structure of investor	1,75	,463	8	8,000
Total	Stake in target company	3,80	,531	35	35,000
	Industry	2,06	1,608	35	35,000
	Region	2,34	,906	35	35,000
	Company size (no. of employees)	2,46	1,245	35	35,000
	Ownership structure of investor	1,63	,490	35	35,000

B.4: SPSS output LDA1 original table 4 (Log determinants)

Log Determinants

HCE groups	Rank	Log Determinant
1	5	-6,058
2	5	-3,300
3	5	-2,477
4	5	-6,957
Pooled within-groups	5	-2,659

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

B.5: SPSS output LDA1 original table 5 (Eigenvalues)

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	,428[a]	60,1	60,1	,547
2	,233[a]	32,6	92,7	,434
3	,052[a]	7,3	100,0	,222

a. First 3 canonical discriminant functions were used in the analysis.

B.6: SPSS output LDA1 original table 6 (Standardised discriminant coefficients)

Standardized Canonical Discriminant Function Coefficients

	Function		
	1	2	3
Stake in target company	,706	-,369	,056
Industry	,328	,930	-,029
Region	-,559	,486	,507
Company size (no. of employees)	,842	-,147	,951
Ownership structure of investor	,267	-,073	-,292

B.7: SPSS output LDA1 original table 7 (Structure matrix)

Structure Matrix

	Function		
	1	2	3
Region	-,672*	,228	,287
Ownership structure of investor	,409*	,199	-,409
Industry	,435	,860*	-,236
Company size (no. of employees)	,501	-,018	,792*
Stake in target company	-,070	-,273	-,452*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

B.8: SPSS output LDA1 original table 8 (Canonical discriminant coefficients)

Canonical Discriminant Function Coefficients

	Function		
	1	2	3
Stake in target company	1,288	-,673	,102
Industry	,219	,619	-,020
Region	-,648	,564	,588
Company size (no. of employees)	,689	-,120	,779
Ownership structure of investor	,543	-,148	-,594
(Constant)	-6,402	,500	-2,672

Unstandardized coefficients

B.9: SPSS output LDA1 original table 9 (Functions at group centroids)

Functions at Group Centroids

	Function		
HCE groups	1	2	3
1	-,664	,042	-,281
2	,463	,682	,054
3	-,505	-,222	,302
4	,795	-,566	-,084

Unstandardized canonical discriminant functions evaluated at group means

B.10: SPSS output LDA1 original table 10 (Classification statistics part 1)

Classification Processing Summary

Processed		35
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	0
Used in Output		35

B.11: SPSS output LDA1 original table 11 (Classification statistics part 2)

Prior Probabilities for Groups

HCE groups	Prior	Cases Used in Analysis	
		Unweighted	Weighted
1	,250	9	9,000
2	,250	9	9,000
3	,250	9	9,000
4	,250	8	8,000
Total	1,000	35	35,000

B.12: SPSS output LDA1 original table 12 (Classification statistics part 3)

Classification Results[b,c]

			Predicted Group Membership				
		HCE groups	1	2	3	4	Total
Original	Count	1	3	1	3	2	9
		2	1	5	1	2	9
		3	3	1	3	2	9
		4	0	1	2	5	8
	%	1	33,3	11,1	33,3	22,2	100,0
		2	11,1	55,6	11,1	22,2	100,0
		3	33,3	11,1	33,3	22,2	100,0
		4	,0	12,5	25,0	62,5	100,0
Cross-validated[a]	Count	1	1	2	4	2	9
		2	1	4	2	2	9
		3	5	2	0	2	9
		4	0	1	2	5	8
	%	1	11,1	22,2	44,4	22,2	100,0
		2	11,1	44,4	22,2	22,2	100,0
		3	55,6	22,2	,0	22,2	100,0
		4	,0	12,5	25,0	62,5	100,0

a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

b. 45,7% of original grouped cases correctly classified.

c. 28,6% of cross-validated grouped cases correctly classified.

B.13: SPSS output LDA1 optimised table 1 (Processing summary)

Analysis Case Processing Summary

Unweighted Cases		N	Percent
Valid		35	100,0
Excluded	Missing or out-of-range group codes	0	,0
	At least one missing discriminating variable	0	,0
	Both missing or out-of-range group codes and at least one missing discriminating variable	0	,0
	Total	0	,0
Total		35	100,0

B.14: SPSS output LDA1 optimised table 2 (Group statistics)

Group Statistics

HCE groups		Mean	Std. Deviation	Valid N (listwise) Unweighted	Valid N (listwise) Weighted
1	Industry	1,78	1,302	9	9,000
	Region	2,67	,866	9	9,000
	Company size (no. of employees)	1,78	,833	9	9,000
2	Industry	3,22	2,279	9	9,000
	Region	2,22	,833	9	9,000
	Company size (no. of employees)	2,78	1,302	9	9,000
3	Industry	1,33	1,000	9	9,000
	Region	2,67	1,000	9	9,000
	Company size (no. of employees)	2,44	1,424	9	9,000
4	Industry	1,88	,991	8	8,000
	Region	1,75	,707	8	8,000
	Company size (no. of employees)	2,88	1,246	8	8,000
Total	Industry	2,06	1,608	35	35,000
	Region	2,34	,906	35	35,000
	Company size (no. of employees)	2,46	1,245	35	35,000

B.15: SPSS output LDA1 optimised table 3 (Log determinants)

Log Determinants

HCE groups	Rank	Log Determinant
1	3	-1,590
2	3	1,434
3	3	,620
4	3	-1,231
Pooled within-groups	3	,789

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

B.16: SPSS output LDA1 optimised table 4 (Box's M test)

Test Results

Box's M		29,353
F	Approx.	1,336
	df1	18
	df2	3304,704
	Sig.	,154

Tests null hypothesis of equal population covariance matrices.

B.17: SPSS output LDA1 optimised table 5 (Structure matrix)

Structure Matrix

	Function		
	1	2	3
Industry	,799*	,543	-,259
Region	-,602	,692*	,399
Company size (no. of employees)	,522	-,388	,759*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

B.18: SPSS output LDA1 optimised table 6 (Canonical discriminant coefficients)

Canonical Discriminant Function Coefficients

	Function		
	1	2	3
Industry	,483	,472	-,091
Region	-,385	,917	,734
Company size (no. of employees)	,346	-,142	,768
(Constant)	-,940	-2,772	-3,420

Unstandardized coefficients

B.19: SPSS output LDA1 optimised table 7 (Classification statistics part 1)

Classification Processing Summary

Processed		35
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	0
Used in Output		35

B.20: SPSS output LDA1 optimised table 8 (Classification statistics part 2)

Prior Probabilities for Groups

		Cases Used in Analysis	
HCE groups	Prior	Unweighted	Weighted
1	,250	9	9,000
2	,250	9	9,000
3	,250	9	9,000
4	,250	8	8,000
Total	1,000	35	35,000

B.21: SPSS output LDA1 optimised table 9 (Classification statistics part 3)

Classification Results[b,c]

			Predicted Group Membership				
		HCE groups	1	2	3	4	Total
Original	Count	1	2	2	1	4	9
		2	1	5	1	2	9
		3	3	1	2	3	9
		4	0	1	1	6	8
	%	1	22,2	22,2	11,1	44,4	100,0
		2	11,1	55,6	11,1	22,2	100,0
		3	33,3	11,1	22,2	33,3	100,0
		4	,0	12,5	12,5	75,0	100,0
Cross-validated[a]	Count	1	1	2	2	4	9
		2	1	5	1	2	9
		3	4	1	1	3	9
		4	2	1	1	4	8
	%	1	11,1	22,2	22,2	44,4	100,0
		2	11,1	55,6	11,1	22,2	100,0
		3	44,4	11,1	11,1	33,3	100,0
		4	25,0	12,5	12,5	50,0	100,0

B.22: SPSS output LDA2 original table 1 (Processing summary)

Analysis Case Processing Summary

Unweighted Cases		N	Percent
Valid		35	100,0
Excluded	Missing or out-of-range group codes	0	,0
	At least one missing discriminating variable	0	,0
	Both missing or out-of-range group codes and at least one missing discriminating variable	0	,0
	Total	0	,0
Total		35	100,0

B.23: SPSS output LDA2 original table 2 (Group statistics)

Group Statistics

HCE groups		Mean	Std. Deviation	Valid N (listwise) Unweighted	Valid N (listwise) Weighted
1	Absorptive capacity 1 score	8,11	6,274	9	9,000
	Absorptive capacity 2 score	10,00	4,062	9	9,000
2	Absorptive capacity 1 score	10,44	3,468	9	9,000
	Absorptive capacity 2 score	9,78	4,236	9	9,000
3	Absorptive capacity 1 score	7,89	5,207	9	9,000
	Absorptive capacity 2 score	9,56	1,740	9	9,000
4	Absorptive capacity 1 score	8,50	3,295	8	8,000
	Absorptive capacity 2 score	15,13	5,743	8	8,000
Total	Absorptive capacity 1 score	8,74	4,667	35	35,000
	Absorptive capacity 2 score	11,00	4,563	35	35,000

B.24: SPSS output LDA2 original table 3 (Log determinants)

Log Determinants

HCE groups	Rank	Log Determinant
1	2	5,771
2	2	5,185
3	2	4,340
4	2	5,870
Pooled within-groups	2	5,816

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

B.25: SPSS output LDA2 original table 4 (Structure matrix)

Structure Matrix

	Function 1	Function 2
Absorptive capacity 2 score	,885*	,465
Absorptive capacity 1 score	-,105	,994*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

*. Largest absolute correlation between each variable and any discriminant function

B.26: SPSS output LDA2 original table 5 (Canonical discriminant coefficients)

Canonical Discriminant Function Coefficients

	Function	
	1	2
Absorptive capacity 1 score	-,105	,200
Absorptive capacity 2 score	,259	,027
(Constant)	-1,926	-2,049

Unstandardized coefficients

B.27: SPSS output LDA2 original table 6 (Functions at group centroids)

Functions at Group Centroids

	Function	
HCE groups	1	2
1	-,192	-,154
2	-,495	,307
3	-,284	-,210
4	1,093	,064

Unstandardized canonical discriminant functions evaluated at group means

B.28: SPSS output LDA2 original table 7 (Classification statistics part 1)

Classification Processing Summary

Processed		35
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	0
Used in Output		35

B.29: SPSS output LDA2 original table 8 (Classification statistics part 2)

Prior Probabilities for Groups

		Cases Used in Analysis	
HCE groups	Prior	Unweighted	Weighted
1	,250	9	9,000
2	,250	9	9,000
3	,250	9	9,000
4	,250	8	8,000
Total	1,000	35	35,000

B.30: SPSS output LDA2 optimised table 1 (Processing summary)

Analysis Case Processing Summary

Unweighted Cases		N	Percent
Valid		35	100,0
Excluded	Missing or out-of-range group codes	0	,0
	At least one missing discriminating variable	0	,0
	Both missing or out-of-range group codes and at least one missing discriminating variable	0	,0
	Total	0	,0
Total		35	100,0

B.31: SPSS output LDA2 optimised table 2 (Group statistics)

Group Statistics

HCE groups		Mean	Std. Deviation	Valid N (listwise)	
				Unweighted	Weighted
1	Absorptive capacity 2 score	10,00	4,062	9	9,000
2	Absorptive capacity 2 score	9,78	4,236	9	9,000
3	Absorptive capacity 2 score	9,56	1,740	9	9,000
4	Absorptive capacity 2 score	15,13	5,743	8	8,000
Total	Absorptive capacity 2 score	11,00	4,563	35	35,000

B.32: SPSS output LDA2 optimised table 3 (Test of equality of group means)

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
Absorptive capacity 2 score	,750	3,453	3	31	,028

B.33: SPSS output LDA2 optimised table 4 (Log determinants)

Log Determinants

HCE groups	Rank	Log Determinant
1	1	2,803
2	1	2,887
3	1	1,108
4	1	3,496
Pooled within-groups	1	2,840

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

B.34: SPSS output LDA2 optimised table 5 (Box's M test)

Test Results

Box's M		9,184
F	Approx.	2,915
	df1	3
	df2	1717,510
	Sig.	,033

Tests null hypothesis of equal population covariance matrices.

B.35: SPSS output LDA2 optimised table 6 (Eigenvalues)

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	,334[a]	100,0	100,0	,500

a. First 1 canonical discriminant functions were used in the analysis.

B.36: SPSS output LDA2 optimised table 7 (Wilks' lambda)

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	,750	9,083	3	,028

B.37: SPSS output LDA2 optimised table 8 (Standardised discriminant coefficients)

Standardized Canonical Discriminant Function Coefficients

	Function
	1
Absorptive capacity 2 score	1,000

B.38: SPSS output LDA2 optimised table 9 (Structure matrix)

Structure Matrix

	Function
	1
Absorptive capacity 2 score	1,000

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

B.39: SPSS output LDA2 optimised table 10 (Canonical discriminant coefficients)

Canonical Discriminant Function Coefficients

	Function
	1
Absorptive capacity 2 score	,242
(Constant)	-2,659

Unstandardized coefficients

B.40: SPSS output LDA2 optimised table 11 (Functions at group centroids)

Functions at Group Centroids

	Function
HCE groups	1
1	-,242
2	-,295
3	-,349
4	,997

Unstandardized canonical discriminant functions evaluated at group means

B.41: SPSS output LDA2 optimised table 12 (Classification statistics part 1)

Classification Processing Summary

Processed		35
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	0
Used in Output		35

B.42: SPSS output LDA2 optimised table 13 (Classification statistics part 2)

Prior Probabilities for Groups

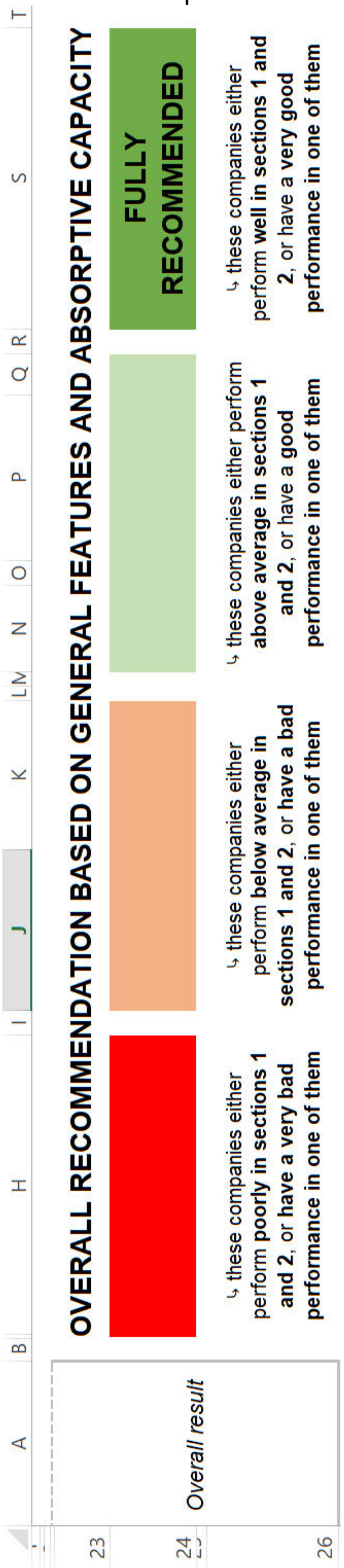
		Cases Used in Analysis	
HCE groups	Prior	Unweighted	Weighted
1	,250	9	9,000
2	,250	9	9,000
3	,250	9	9,000
4	,250	8	8,000
Total	1,000	35	35,000

C.1: Success prediction of *SolarWorld AG* part 1

	A	B	C	D	E	F	G	H	I	J	K	L
4	*Section*		**SECTION 1**									
6	*Type of predictor measure*		GENERAL FEATURES:									
7			Please choose information of the German target company regarding its general characteristics:									
9	*Independent variables*		**INDUSTRY**			**REGION OF GERMANY**				**COMPANY SIZE**		
12												
13	*User input*		**Energy**			**East**				**>2000**		
14												
15												
16												
17												
18	*Individual success tendencies for predictor measures*					↓						
			↳ companies with these general prerequisites usually perform **poorly** after acquisition by a Chinese investor			↳ companies with these general prerequisites usually perform **below average** after acquisition by a Chinese investor		↳ companies with these general prerequisites usually perform **rather well** after acquisition by a Chinese investor		↳ companies with these general prerequisites usually perform **very well** after acquisition by a Chinese investor		
20												

	A	B	N	O	P	Q	R	S	T	U	V	W
4	*Section*		**SECTION 2**									
6 7	*Type of predictor measure*		MEASURES OF ABSORPTIVE CAPACITY: Please enter information of the German target company for 4 (but at least 3) consecutive years to calculate its AC measures:									
9 10	*Independent variables*		**ABSORPTIVE CAPACITY 1** Patents		No. of employees			**ABSORPTIVE CAPACITY 2** Annual sales (EoP)		Fixed assets		Depreciation on F/A
12	*User input*		**59**	t1	**2073**		t1	**455,821,000 €**	t1	**306,866,000 €**	t1	**41,877,000 €**
13			**53**	t2	**2730**		t2	**573,382,000 €**	t2	**344,735,000 €**	t2	**45,440,000 €**
14			**77**	t3	**2932**		t3	**763,465,000 €**	t3	**319,825,000 €**	t3	**44,966,000 €**
15			**55**	t4	**3034**		t4	**803,066,000 €**	t4	**277,458,000 €**	t4	**73,066,000 €**
16 17 18	*Individual success tendencies for predictor measures*											
20			↳ companies with these AC-prerequisites usually perform **poorly** after acquisition by a Chinese investor					↳ companies with these AC-prerequisites usually perform **below average** after acquisition by a Chinese investor		↳ companies with these AC-prerequisites usually perform **rather well** after acquisition by a Chinese investor		↳ companies with these AC-prerequisites usually perform **very well** after acquisition by a Chinese investor

C.3: Success prediction of *SolarWorld AG* part 3



	OVERALL RECOMMENDATION BASED ON GENERAL FEATURES AND ABSORPTIVE CAPACITY			
Overall result				FULLY RECOMMENDED
	↳ these companies either perform **poorly in sections 1 and 2**, or **have a very bad performance in one of them**	↳ these companies either perform **below average in sections 1 and 2**, or **have a bad performance in one of them**	↳ these companies either perform **above average in sections 1 and 2**, or have a **good performance in one of them**	↳ these companies either perform **well in sections 1 and 2**, or have a **very good performance in one of them**

C.4: Success prediction of *SolarWorld AG* part 4

	A	B	C	D	E	F	G	H	I	J	K
33			**Categories of "Industry"**			**Categories of "Region"**		**Categories of "Company size"**			
34											
35	1		Machinery		1	North	1	<=100			
36	2		Electronics		2	West	2	101-500			
37	3		Automotive		3	East	3	501-1000			
38	4		Metals		4	South	4	1001-2000			
39	5		Chemicals				5	>2000			
40	6		Textiles								
41	7		Energy								
42											
43			**Input "Industry":**			**Input "Region":**		**Input "Company Size":**			
44	**User input:**		7			3		5			
45			**Classification scores:**			**Classification scores:**		**Classification scores:**			
46	**LDA1 Score 1:**		9.52			14.796		10.76		**LDA1 Total 1:**	*23.992*
47	**LDA1 Score 2:**		13.867			14.439		13.96		**LDA1 Total 2:**	*28.463*
48	**LDA1 Score 3:**		8.218			15.156		13.125		**LDA1 Total 3:**	*24.386*
49	**LDA1 Score 4:**		8.911			11.631		13.405		**LDA1 Total 4:**	*24.121*
50											
51								**Classification functions of LDA1:**			
52			**Constant:**			**"Industry" coefficient:**		**"Region" coefficient:**		**"Company size" coefficient:**	
53	**LDA1 Group 1:**		-11.084			1.36		4.932			2.152
54	**LDA1 Group 2:**		-13.803			1.981		4.813			2.792
55	**LDA1 Group 3:**		-12.113			1.174		5.052			2.625
56	**LDA1 Group 4:**		-9.826			1.273		3.877			2.681

C.5: Success prediction of *SolarWorld AG* part 5

	P	S	U	W	Y	Z	AB	AC
43			**Input "AC1":**	**Input "AC2":**			**LDA1+2 Total Score:**	
44	**User input:**		-0.34444278	32.60435943				
45			**Classification scores:**	**Classification scores:**				
46	**LDA2 Score 1:**		-0.067855228	16.33478407	**LDA2 Total 1:**	*11.58092884*	**LDA1+2 Total Score 1:**	***35.57292884***
47	**LDA2 Score 2:**		-0.11022169	14.18289635	**LDA2 Total 2:**	*8.887674661*	**LDA1+2 Total Score 2:**	***37.35067466***
48	**LDA2 Score 3:**		-0.067166342	15.48707073	**LDA2 Total 3:**	*10.99390439*	**LDA1+2 Total Score 3:**	***35.37990439***
49	**LDA2 Score 4:**		-0.036166492	27.35505756	**LDA2 Total 4:**	*19.14189107*	**LDA1+2 Total Score 4:**	***43.26289107***
50								
51		**Classification functions of LDA2:**						
52		**Constant:**	**"AC1" coefficient:**	**"AC2" coefficient:**				
53	**LDA2 Group 1:**	-4.686	0.197	0.501				
54	**LDA2 Group 2:**	-5.185	0.32	0.435				
55	**LDA1 Group 3:**	-4.426	0.195	0.475				
56	**LDA1 Group 4:**	-8.177	0.105	0.839				

Declaration of originality

I hereby declare that this thesis and the work reported herein was composed by and originated entirely from me. Information derived from published and unpublished work of others has been acknowledged in the text and references are given in the list of references.

Statement of consent

I hereby declare my consent that a copy of this master thesis is entered into the library of the department. The rights of third parties are not infringed.