Does sustainability add value for corporations?

- With special evidence for the real estate industry -

IRE|BS
International Real Estate Business School
Universität Regensburg

Dissertation zur Erlangung des Grades

eines Doktors der Wirtschaftswissenschaft

Eingereicht an der Fakultät für

Wirtschaftswissenschaften der Universität Regensburg

Vorgelegt von: Nelufer Ansari, MScRE

Berichterstatter: Prof. Dr. Sven Bienert

Prof. Dr. Wolfgang Schäfers

Dedicated to the most generous and loving people on earth

– Inge and Peter Brozinski –

Table of Contents

1 Introduction

Sustainable development might be one of the most contested but also precious concepts of the past decades. Presented as an intersection between the entities environment, society and economy it roots back in 1987 when the Brundtland Commission first reported on the global environment and development. Its main intention is to promote intra- and intergenerational justice by a sustainable development that meets the needs of the present generations without compromising the ability of future generations to meet their own needs.[1] However, the familiar cliché that actions speak louder than words reflects the zeitgeist. Ever since the deliberation of the term sustainability by the Brundtland Commission, the term sustainable development has been adopted manifold depending on the intention it might had to serve. As a result, the term was rather used to justify or beautify actions, in part contrary to the initial concept of sustainable development. Now, in the face of unhindered population growth, resource exploitation, global climate change going along with the pursuit for higher profits, cost savings and economies of scale the core sustainability intentions seem to be fading away. As a result, the fragility of today's world becomes obvious and worthy of protection, more than ever.

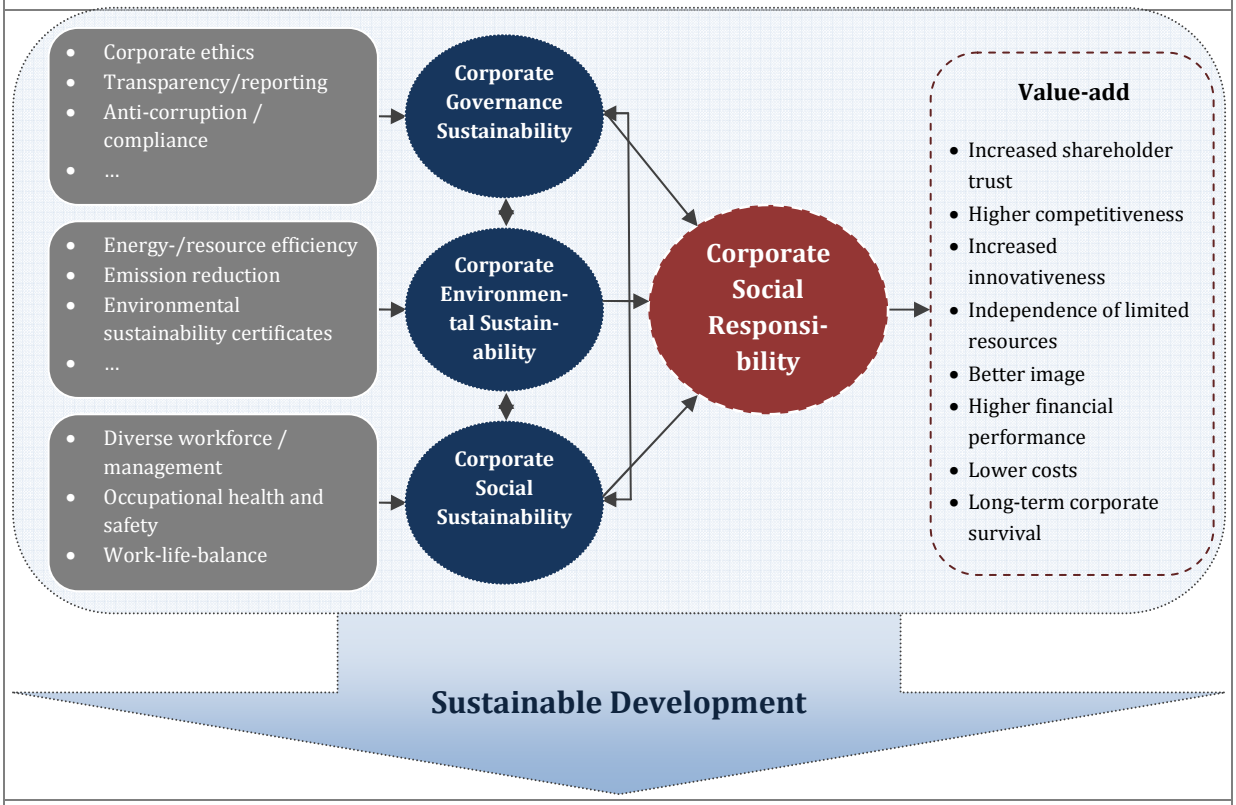
In this context, especially corporations are increasingly identified as one of the major contributors to non- sustainable developments, harming the environmental and social intactness. Triggered by globalization and increased international competition, profit maximization and cost reduction were generated at the expense of environmental and social consciousness. These external effects and costs of unhindered growth were in turn born rather by the society than by the originator. Furthermore, large multinational companies' operations grew increasingly outside of the controlling mechanisms of local legal frameworks. With increasing size and international corporate subsidiary systems corporations were able to increase their power. These developments further triggered stakeholders' desires for more control and accountability, for a more *polluter-pays-principle*. The result was the movement of the social responsibilities of the businessman, coining the new term Corporate Social Responsibility (CSR) for the business world's responsibility for a conscious business.

[1] United Nations, World Commission on Environment and Development (WCED), "Our common Future", 1987, p. 37.

1.1 General motivation and theoretical foundation

Reality shows, it is not easy to convince corporations to adapt environmental and social conscious business methods and invest into sustainability, particularly when in many countries in the world almost no consequences other than loss of reputation is to be feared. Despite today's public pressure for companies to sport a perfectly clean record, the perception that sustainability generates costs and is rather an act of altruism is still prevalent in the business world. The results are '*greenwashing*' aspirations for marketing purposes rather than implementing sustainability in the core business of the company. Therefore, to understand corporate sustainability's raison d'être one main question is in the centre of attention: '*Does sustainability pay-off for corporations?*'. The answer to this question is of great importance as it triggers momentous implications for practice. If environmental, social and economic conscious management would, next to a better image, lead to other more tangible positive effects, i.e. financial or non-financial benefits, then corporations would engage in sustainability voluntarily, leading to a domino effect. In the academic world a large stream of research focuses on the financial advantages of social and environmental consciousness that is on sustainable corporate management. This assumed relationship is outlined in the following exhibit 1.1.

Exhibit 1.1 | Corporate sustainability – value add model



Source: Own illustration in accordance with ZIA (2015).

The value-add results mainly from long-term positive pay-offs of sustainable management and investment decisions. In the context of governance sustainability, it comprises the systems and processes a company utilizes, i.e. the management of the company according to the best management practices in order to create shareholder value. Good governance is strongly associated with increased shareholder trust, good image and due to adequate management decisions also increased financial performance. Concerning the second dimension, the direction of action emphasizes that companies add value by investing in environmental sustainability. In other words, investments in resource efficient production methods, recycling or up-cycling of waste, the reduction of hazardous emissions not only results in environmental protection, but also in lower dependencies on limited natural resources, increased innovativeness, cost reduction and thus long-term competitiveness and profitability. Furthermore, over the course of time, governmental initiated environmental regulations are becoming stricter. Hence, being able to adopt innovations at an early stage, secures future-proofness. This in turn not only increases the corporate image as a highly innovative company but also ensures the long-term survival. Lastly, also a comprehensive sustainable management concerning the social element has positive value-adding impacts. Good employee management increases staff loyalty and productivity, decreases employee turnover and rate of absence. Satisfied employees recommend their employer, increasing the attractiveness of the company for new high-potentials. Also, satisfied staff exhibits greater motivation and better performance resulting in value creation. The whole value-creation aspect in turn presents economic sustainability which is one of the duties of private businesses towards shareholders. The presented relationship is especially unexplored for the real estate sector. Though according to the OECD, the real estate and construction industry is one of the main contributors to the climate change. As such, the construction, operation and dismantling of real estate properties are responsible for 25 – 40 % of the global energy consumption, for about 30 % of the global raw material consumption, for about 30 – 40 % of the greenhouse gas emissions, for 30-40 % of the global waste generation and for about 20 % of the global water consumption.[2] Despite this prominent role, the sector is still under-represented in academic research studies concerning sustainability.

[2] OECD (2003), "Environmentally Sustainable Buildings – Challenges and Policies", Paris.
Nelson, A./ Rakau, O./Doerrenberg, P. (2010), „Green buildings – A niche becomes mainstream", RREEF Research.

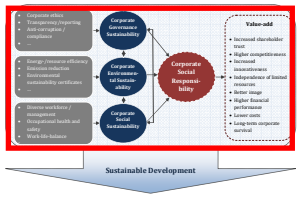
Furthermore, with global worth of 217 trillion USD – as a comparison to get the figures more tangible: the world's economy outputs 80 trillion USD – the real estate sector including commercial and residential property and forestry and agricultural land plays a key role in the global economy.[3] As stated by Yolande Barnes, head of Savills world research: "*Real estate is the pre-eminent asset class which will be most impacted by global monetary conditions and investment activity and which, in turn, has the power to most impact national and international economies*." [4] Additionally, the increasing institutionalization of shareholdings and the increasing global competitiveness for fresh capital results in investors making high demands for good corporate governance as a prerequisite for investments. Moreover, this investment clientele even asks for specific sustainable investment products, developing a market of its own. Underpinning, market research has found evidence that sustainability criteria are getting more and more important for investors. According to the Global Sustainable Investment Alliance (GSIA), the global sustainable investment assets have peaked to 21.4 trillion USD in the beginning of 2014, starting from 13.3 trillion USD in the outset of 2012, determining a total growth of 61 %.[5] Hence, on a global scale, the proportion of SRI assets in relation to total managed assets in the areas covered by the study (Europe, Canada, USA, Australia and Asia) has increased to 30.2 % in 2014, from 21.5 % in 2012.[6] In this context, the relatively young real estate sector has a considerable backlog. Hence, taking these elaborations into account, it becomes clear that the real estate sector has a research gap concerning the above mentioned sustainability aspects. If research manages to find further evidence for sustainability driven value creation, this might trigger the private business to re-think and adopt sustainability measures, concluding in a better triple bottom line – environmental, social and governmental sustainability. Hence, this work's aim is to close this research gap and find empirical evidence for the presented theoretical correlation with special focus on the real estate sector. By means of three separate articles focusing on the above presented three dimensions of sustainability, this work's target is to find empirical evidence for the value-adding effects of corporate sustainability. In this light, particularly the real estate sector is analyzed – where appropriate solely. The majority of the work combines a real estate perspective view in

[3] http://fortune.com/2016/01/26/rea-estate-global-economy/.
[4] http://fortune.com/2016/01/26/rea-estate-global-economy/.
[5] Global Sustainable Investment Alliance (GSIA) (2014), "Global Sustainable Investment Review", p. 7.
[6] Global Sustainable Investment Alliance (GSIA) (2014), "Global Sustainable Investment Review", p. 7.

a comparative combination with other industries or across all sectors. The following section presents the research questions separately for the specific articles.

1.2 Research questions

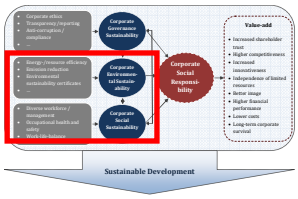
Since every article targets a specific aspect of the sustainability framework, this section provides a basic overview of the questions that are necessary to determine the specific research objectives of each article.



The value contribution of sustainability reporting - an empirical evidence for real estate companies

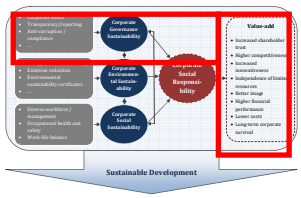
- What is sustainability reporting and what are the current tools?
- Is reporting according to GRA guidelines accepted by the market?
- Does the publication of sustainability reports itself lead to any value-relevant changes on the market or are the relevant information already priced in the share prices?
- Are the information provided in sustainability reports of decision relevance for investors and capital markets?
- If investors do value information on sustainability, what is the value-relevant magnitude of this appreciation?
- What is the distribution of the difference in the stock price index after and before the event for the total sample?
- How does the before minus after effect behave over the event window?
- How does the cumulative abnormal return (CAR) behave over the event window?
- How is the distribution of the cross-sectional CAR?
- What is the significant CAR regardless the time series component and firm heterogeneity?

Management diversity and superior corporate environmental performance – a global longitudinal analysis with special evidence for real estate companies



- What is the current state of research on gender diversity in management and corporate sustainability, in particular environmental sustainability performance?
- What mechanisms and frameworks explain the positive effects of gender diversity in management compared to gender diversity on board level?
- What is the magnitude of the impact on the overall environmental sustainability performance?
- Which environmental sustainability dimension is effected the most by gender diverse management and what is the magnitude?
- Does the real estate industry specifically profit from increased gender diverse management?
- What is the effect for companies with at least 10 % female managers?
- Are the results robust across different sectors (industry, utilities, finance & insurance) and different diversity measures (proportion of female employees?
- Are the results still robust if a different regional sub-sample (EU-sub sample) is analyzed?

Determinants of board of directors and corporate performance with special evidence for real estate companies



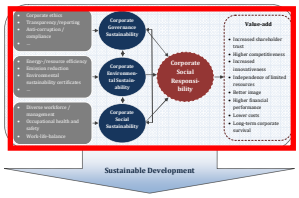
- In what ways do board of directors' characteristics affect the corporate financial performance?
- What is the current research on the link between corporate governance and corporate financial performance in general as well as specifically for the real estate industry?
- What is the aggregated governance quality (rating) of the real estate industry in comparison to other sectors (industrial sector, utilities & consumer goods and technology)?

- What is the effect of the analyzed four board characteristics on Tobin's Q for the total sample, the real estate sector and the different sub-samples (industrial sector, utilities & consumer goods and technology)?
- Which of the board characteristics exert the highest influence on corporate financial performance?
- Are smaller companies more sensitive to changes concerning the four board characteristics of interest?
- Is there 'one governance' concept that is relevant for all companies over all sectors?
- Are the results robust for different regional sub-samples (Europe, U.S. and East & Asia)?

1.3 Course of analysis

This section provides an overview of the course of analysis in chronological order of development, the publication status as well as the authorship of the three contributing articles.

The value contribution of sustainability reporting - an empirical evidence for real estate companies



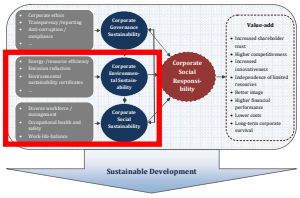
The main purpose of this article is to examine the value contribution of sustainability reporting. For the first time this is undertaken with GRI data and specifically for the real estate sector. Thereby, the data on sustainability reports and their publication dates were collected manually. The event study methodology is used to determine, whether the *event* of publishing sustainability report results in abnormal stock returns. Generally, in a transparent market, stock prices reflect the current performance and investors' expectations about the future profitability and growth of a company. Hence, abnormal returns as an answer to the publication of sustainability reports means that sustainability reports provide new information that are not yet priced in the stock prices and are of value-relevance for investors. Taking this into account, as a first step the event window is determined. This is set according to research to 106 days before and 106 days after the release, covering 91 trading days. Followed by an initial descriptive analysis, determining the differences between the after publication stock price and the before publication stock price by setting the share price index at 100 at the event date. The "before minus after" approach is undertaken to get a first descriptive impression of the distribution of the differences across the sample. The main analysis section determines the cumulated abnormal returns (CAR) for a cross-sectional view, a time depending view and a cross-section and time independent view. For this, the abnormal returns are determined according to the market model as the differences between the actually observed return of a security in the capital market less the estimated return of the security over the event period. The estimated returns are calculated according to the market model whereby the main broad market indices of the respective countries (DAX, CAC, S&P, FTSE, etc.) are taken as benchmark. The thus-determined abnormal returns are cumulated over securities, over time and over time as well as securities and tested for significance.

Authors: Nelufer Ansari, Marcelo Cajias, Sven Bienert

Submission to: ACRN Journal of Finance and Risk Perspectives (JoFRP)

Current Status: published in Volume Vol.4 Issue 4, October 2015, p. 190-205

Management diversity and superior corporate environmental performance – a global longitudinal analysis with special evidence for the real estate industry

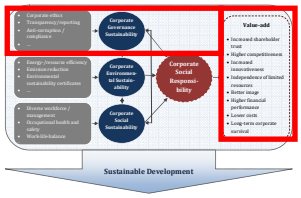


This article aims to analyze the link between gender diversity in management and corporate environmental sustainability performance. This assumed positive link is derived from major research on board gender diversity and corporate financial performance. The main drawback of female directors and regulatory quotas that shall increase board gender diversity is tokenism. Hence, as a first step the theoretical argumentation is developed concluding that for the positive effects of gender diversity to become apparent, gender diversity on decision-making management level besides the board of directors is important. Furthermore, environmental sustainability is indirectly linked to increased financial performance. A large set of data derived from Thomson Reuters Asset4ESG rating is combined with financial data for the years 2002-2015 and processed until a panel structure is derived. As an initial step the descriptive statistics of different sub-samples are compared. This allows a first impression of the distribution of female managers and environmental sustainability quality. For the main analysis it is first tested whether a fixed effects or a random effects model is more suitable for the unbalanced data structure. In this context, the Hausman test is performed. The results provide evidence, that a fixed effects model is more appropriate. In order to control for multicollinearity which is a main problem of panel data at least the first lag of the dependent variable is included in the regression equation. The final lag order for a specific model is determined according to the included lag's contribution to model enhancement. A subsequent test for multicollinearity by determining the variance inflation factor confirmed the procedure. Another indicator affirming the approach are the Durbin-Watson test results ranging around the threshold value of 2. Furthermore, in order to control for heteroscedasticity, the white cross-section coefficient covariance method is applied. In the main part, ordinary least squares regressions with fixed effects panel data are performed by regressing the number of female managers on the total environmental rating score and the four sub-ordinate pillar scores. This procedure is repeated for a sub-sample with at least 10 % female managers to test whether

increasing number of female managers enhances the effect. As a second step, the procedure is repeated for the real estate and construction industry specific sub-sample. Finally, the robustness test is performed for different diversity measures (the percentage of female employees) and for a non-financial as well as European sub samples.

Authors: Nelufer Ansari, Sven Bienert
Submission to: Journal of Sustainable Real Estate (JOSRE)
Current Status: Under review

Determinants of board of directors and corporate performance with special evidence for the real estate industry



This article is based on the same data set like the previous one, but focuses instead of gender diversity and environment on the financial performance implications of corporate governance, in particular of four board of director characteristics: size of the board, annual meeting frequency, number of non-executive and number of independent board members. The financial performance indicator applied, is Tobin's Q – a market based and future-oriented measure that reflects investors' expectations about the company's future performance and competitiveness. In order to get a first impression of the governance quality of different sectors, descriptive statistics of various sectors (real estate, industrial sector, utilities & consumer goods and technology) are compared with each other according to the four board characteristics and different aggregated governance measures. In particular, these aggregated governance measures are the overall governance rating (CGVSCORE), the board functions score (CGBF) as well as the board structure score (CGBS). The main intention is to find an initial evidence for the in academia common perception that real estate and construction companies have specific governance needs. Beyond this initial distributional analysis, the main part of the empirical work contains ordinary least squares regression analysis based on unbalanced panel data to determine the coefficients of interest. For this, as an initial step, the appropriateness of a fixed effects or a random effects model is determined. The results of the applied Hausman test clearly speak for a fixed effects panel data model. Multicollinearity is controlled for by additional consideration of lagged dependent variables as explanatory variables. The degree of lags results out of testing for model

efficiency and goodness of fit. The variance inflation factor and the Durbin Watson test results confirm the procedure. White cross-section coefficient covariance method is applied to correct for heteroscedasticity. In order to test whether there is *one* "governance concept" applicable for all sectors, the influence of board characteristics on Tobin's Q is determined for the previously named sub-samples. According to previous research, company size in terms of the assets under management also determines governance needs. Hence, to test this assumption, the sample is divided into a big and a small sub-sample. The threshold number for this differentiation is the median of the total assets (3,957,001 EUR). The robustness of the results is checked with an analysis of different geographical sub-samples. The reason for this is that the results of sub-samples concerning size or sector revealed differing results. Hence, if the results also present sensitivity to regional distribution, clear signs are given for distortion. However, this could not be confirmed for all board variables of interest.

Authors: Nelufer Ansari
Submission to: Journal of Management and Governance
Current Status: Under review

2 The value contribution of sustainability reporting - an empirical evidence for real estate companies

2.1 Introduction

The threats of the anthropogenic climate change, the still prevalent poverty in some large parts of the world, the exploitation of natural resources, the turmoil in the business world such as spectacular failures in the economic system have all triggered a process of rethinking at the level of society as well as corporations. The behaviour of corporations as one of the main contributors to this development got in the center of attention and society's critical voices rose asking for greater restraints of firms' aspirations for profit maximization. A business as usual is no longer acceptable. Especially, when one considers that despite worldwide efforts to reduce anthropogenic climate change, the global greenhouse gas emissions in CO2-equivalents increased in the period 2012-2013, by further 3% p.a. and amounted now around 32 gigatonnes p.a. marking the highest ever measured value (Munich Re, 2013).

It is therefore not surprising that over the past two decades sustainable development has become one of the major challenges of globally operating companies (Melé et al., 2006; Skouloudis et al. 2009). Thus, corporate responsibility forces companies to anticipate social and environmental effects in their decision-making processes and integrate Corporate Social Responsibility (CSR) into corporate strategies (Cajias/Bienert 2011). Hence, in accordance to the triple bottom line companies have to preserve a balance between social, environmental and economic objectives nowadays in order to meet the needs of internal and external stakeholders. However, the success of these efforts stands or falls with proper communication. In this context, (particularly) sustainability reports such as the frameworks of the Global Reporting Initiative (GRI) – as the sustainability reporting standard used worldwide – enjoy increasing popularity.

Especially the construction and real estate industry as one of the key drivers for resource scarcity and climate changes bears great responsibility in promoting sustainable development. According to the OECD, the construction, operation and dismantling of buildings as well as construction works are responsible together for ca. 25-40% of the global energy consumption, for approximately 30% of raw material consumption, for 30-40% of greenhouse gas emissions, for 30-40% of the waste volume and for 20% of global water consumption (Nelson/Rakau/Doerrenberg, 2010). The

United Nations even assume that considering the population growth going along with massive construction activities, the greenhouse gas emissions caused by the real estate sector could even double in the next two decades (UNEP, 2009). For the European Union, Nelson/Rakau/Doerrenberg (2010) figured out that the construction and real estate sector is responsible for 42% of the final energy consumption and for about 35% of the total greenhouse gas emissions. These results show clearly that the awareness of sustainability and a pro-active approach towards sustainable development is crucial for this industry and for the entire system in terms of intergenerational justice. However, promoting this desired "sustainable or responsible behaviour" has ever since been a major question among practitioners and researchers. If sustainability would only have been a matter of altruism, corporations would always opt for profit maximization. Thus, a large body of literature dedicates to analyze the impacts of corporate sustainability on corporate success, rejecting the hypothesis of a pure altruism among CSR-focused firms. In this context, the aim of this paper is to analyze by means of an event study the impact of sustainability reporting on listed real estate companies. By this, we want to find out, whether investors reward sustainability reports with higher returns and provide evidence for a positive impact of sustainable behaviour and the stock returns for real estate companies.

2.2 Literature review

2.1.1 Corporate Social Responsibility

The term Corporate Social Responsibility or Corporate Sustainability has evolved to a major concept for companies' contribution to sustainable development. It is undeniable that CSR has developed in terms of importance and significance from an irrelevant and rather fashionable topic to one of the most widely used concepts in the business world (Lee, 2008). Both concepts are interlinked and widely used though a globally accepted definition is still not given. The most common definition is the one presented by the European Commission according to which CSR is "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" (COM 2001, 366). It further states that "Corporate Social Responsibility concerns actions by companies over and above their legal obligations towards society and the environment" in order to increase the companies' competitiveness (COM 2011, 0681). Hence, CSR reveals all the

environmental, social and economic aspects of a company that has both a direct or indirect impact on the businesses (Turcsanyi/Sisaye, 2013) and its stakeholder groups such as employees, investors, communities and especially in the case of multinational corporations the broader society and environment.

The basis for corporate sustainability is the convening of the World Commission on Environment and Development (also commonly known as the Brundtland Commission) by the United Nations General Assembly in 1983. The main aim of this initiative was to unite countries for pursuing sustainable development together. The 1987 released report "Our Common Future" characterized sustainable development as a development that meets the needs of present generations without compromising the ability of future generations to meet their own needs (Brundtland Report, 1987). The Agenda 21 – a comprehensive action plan to promote sustainable development – was the Agreement of 178 countries in the Earth Summit UN Conference on Environment and Development in Rio de Janeiro in 1992.

2.1.2 The reporting framework on sustainability

Corporate reporting was ever since an ideal medium for stakeholder communication. Traditionally, financial reporting was predominantly important to shareholders and potential investors. With the increased awareness for sustainability and sustainable investments among investors, shareholders as well as the broader society, the critics on corporate reporting practices became abound. The failure of annual reports or other regulatory files such as 10 Ks to provide detailed information on corporate's environmental and social performance has been in the centre of the critics making information about corporate contribution to sustainable reporting inevitable. The solution seemed to be reporting covering the triple-bottom-line with its economic, social and environmental dimensions. Despite the number of companies publishing sustainability reports is growing in a fast pace, the presented information are lacking uniformity, consistency and comparability calling for a global standard in sustainability reporting (Dilling, 2009). Especially, since corporate reporting on sustainability is still a matter of voluntary commitment, the major challenge is to overcome '*greenwashing'* and interpretational tendencies (Laufer, 2003; Ramus/Montiel, 2005).

The Global Reporting Initiative as one of the most appreciated non-profit organization attempted to fill this void by providing a comprehensive sustainability framework. Established in 1997 out of the coalition between Environmentally Responsible Economies (CERES) and the United Nations Environment Program (UNEP), the GRI is a multi-stakeholder governed non-profit institution located in the Netherlands with the main aim to provide globally accepted standards for sustainability reporting. Hence, its mission is "to enhance responsible decision-making by promoting international harmonization in reporting relevant and credible economic, environmental and social performance information" (GRI, 2002). Based on a broad understanding of the triple-bottom-line, the GRI has developed and published its first Exposure Draft of GRI Sustainability Reporting Guidelines in 1999. After the launch of the GRI G3 – the third generation of sustainability reporting framework and the publication of the G3.1 guidelines – an update and completion of G3, with expanded guidance on reporting gender, community and human rights-related performance, GRI released in May 2013 the fourth generation of its guidelines – GRI G4. Sector supplements provide guidance for diverse industries such as the real estate industry.

2.1.3 Determinants of sustainable disclosure

Though sustainability reports are not mandatory, they fulfil an accountability function towards stakeholder. By providing information it reduces the information asymmetries between the company and its stakeholders. Thus, information beyond what is available in the financial disclosure has evolved to an essential mean to maintain the trusting relationship with the stakeholders and as such the license to operate (Krajnc/Glavi, 2005; Gilbert/Rasche, 2007; Alonso-Almeida, 2009). Beside this, there are impacts on different levels of the corporation. Concerning the employees, the effect is twofold. On the one hand, by reporting on the corporate activities regarding sustainability the employees get informed and have a better understanding for the reasons of specific actions. On the other hand, the firm's sustainable behavior also promotes the motivation of the employees or can increase the attractiveness of the company for potential employees (COM, 2001; Weber, 2008). CSR has effects on the employees with regard to work-life balance, remuneration, working conditions etc. As such, CSR and reporting about it can help to increase the overall employee level of information about sustainability, satisfaction and by this the work ethics. When it comes to investors, by

reporting on corporate responsibility, corporations can attract socially responsible investors. The Socially Responsible Investment (SRI) market has reached huge volumes in the past few years. According to the Eurosif European SRI (2014), the market for socially responsible investments in Europe has grown from 13.8 billion to 16.8 billion, a total growth of 22 % (Eurosif, 2014). Research studies by Geczy et al. (2003) and Bauer et al. (2005) find out that more and more capital is invested in ethical investment funds proving the increasing demand for ethical investments opportunities by investors.

Another stream of literature assumes that on corporate side, sustainability disclosure is a media tool that "reveals the positive and negative aspects of a firm's strategies" (Cajias/Bienert, 2011). However, there are contradictionary opinions. While the study of 600 European companies by Albers/Gunther (2010) showed that high capitalized companies and companies adhering to sustainability indices are more likely to publish social reports, Cajias/Geiger/Bienert (2012) proved that increased media presence goes along with increased probability for sustainability disclosure. Cajias/Bienert (2011) also focus on whether financial transparency determines CSR since according to them media visibility highly correlates with corporate size. The analysis of listed real estate companies showed furthermore that business complexity and financial transparency enhance the provision of sustainability information across Europe.

2.1.4 Sustainable disclosure and corporate performance

Sustainability reporting and financial performance was not subject to many studies, especially in the real estate industry. Murray et al. (2006) analyzed 100 largest UK companies (across all sectors) to find out that there is no relationship between market returns and corporate social and environmental disclosure. However, the longitudinal analysis proved a significant relationship between positive returns and high levels of disclosure meaning that companies with high abnormal returns are also expected to have higher disclosure on sustainability due to greater amount of resources that can be diverted to several sustainability areas. Jones et al. (2007) analyzed the value relevance of sustainability reporting by means of a sustainability index regressed against a wide range of financial and market performance metrics of 100 listed Australian companies. The results show a strong relationship between sustainability disclosure and a range of corporate financial performance metrics, such as operating cash flow to total assets, working capital to total assets, and capital expenditure to assets, among others.

Especially for the real estate sector there are to our knowledge no research studies analyzing the value contribution of sustainability reports. Hence, this research will fill the void and make a contribution to the academic research in this specific field.

2.3 Research design

2.3.1 Research approach

Abnormal returns on the stock market reflect the current performance and investors' expectations about the future profitability and growth of a company. These abnormal returns can be triggered by "events" which can be the announcement of new information or occurrences that are not already priced by stock prices. We focus on testing whether the publication of sustainability reports results in abnormal returns on the stock market, hence they have a positive impact on the stock value and consequently on companies' long-term growth. The positive valuation of the company in terms of abnormal returns might be the results of the detailed and explicitly information on sustainability, which is provided in the (GRI-) report as it is directly connected with a more specific management and long-term corporate strategy. The submission and acceptance of a sustainability report is only successful if the company can prove the integration of sustainability in the corporate strategy. This is done by the submission of the first sustainability report. Thus, the submission of the following reports to the GRI provides information on the changes of the sustainability key performance indicators. Hence, shareholders and potential investors link sustainable corporate management concerning all sustainability dimensions – economic, ecologic and social – with lower risk and higher corporate legitimacy having also a positive effect on the long term corporate performance.

Given the broad findings of previous literature, if sustainability disclosures are considered value-relevant to investors, we would expect higher (lower) sustainability disclosing entities to have relatively higher (lower) abnormal stock returns, after controlling for factors that can be systematically related to abnormal returns, such as firm financial performance and firm size (we do not control for that factors since we do not have a regression model). Hence, the specific research question is whether sustainability reports affect stock prices positively and therefore do pay off. Especially, if one considers the costs for preparing sustainability reports, the costs for measuring

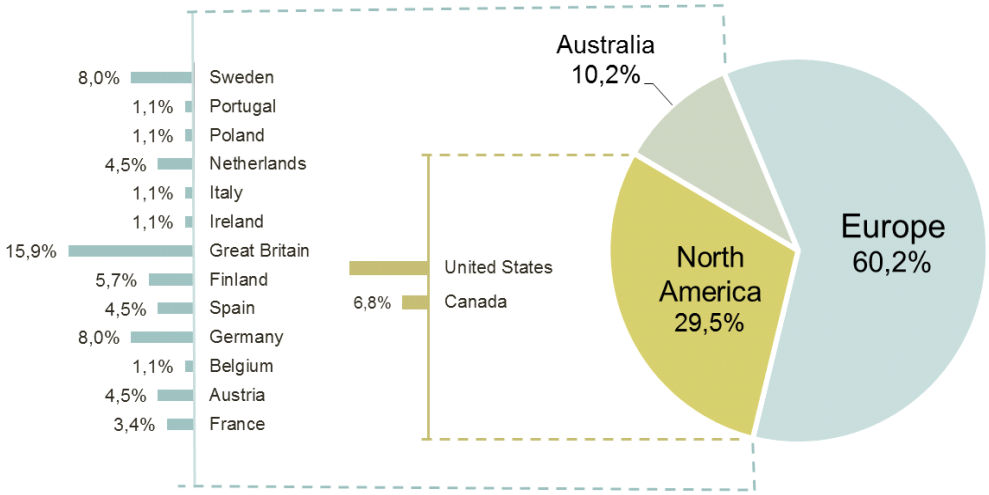
sustainability performance, etc. positive results would indicate that the information on sustainability is of decision relevance for investors and capital markets.

Furthermore, by using two different publication data sources – the company's press release and the GRI publication database – we are able to validate our results. This paper is to our knowledge one of the first studies that uses the GRI-database for empirical studies on abnormal stock returns. Hence, a GRI conformed disclosure might be accepted and appreciated more widely in the market than other voluntarily undertaken disclosure forms, but also enables a greater visibility in capital markets. Thus, the second question to answer is whether the publication by GRI experiences a higher acceptance among shareholders and investors, hence is of higher decision-usefulness in relation to the traditional disclosure by companies' annual reports. If so, this would imply a greater trustworthiness of GRI compared to company's' publication since GRI publishes the reports after an internal verification process.

2.3.2 Sample description and research design

The data used to determine the listed real estate companies disclosing sustainability reports was derived from the GRI database. We aggregated and screened the GRI reporting data room for real estate and construction companies. Thus, the initial sample covered 385 construction and real estate companies worldwide publishing sustainability reports during the time period from 1999 till 2014. Subsequently, this data set was matched with the real estate data room of Thomson Reuters Datastream. For the matching procedure it was necessary to gather the company specific ISIN information since the GRI list only contains the company names. Hence, the ISIN was researched for every company by means of Datastream and internet research. As a result the initial GRI long list was reduced by all non-listed companies, insolvent and non-operating companies as well as companies with no information applicable, resulting in a remaining data space of 190 listed real estate companies. For these companies, extensive internet research taking into account especially the corporate and GRI website was undertaken to find the exact publication dates of their sustainability reports. However, the publication date was not available for all researched companies leading to a reduced list of 94 companies. A further adjustment eliminating all obsolete data such as companies with no information on performance measures, real estate funds, etc. left a final sample of 89 publicly listed real estate companies.

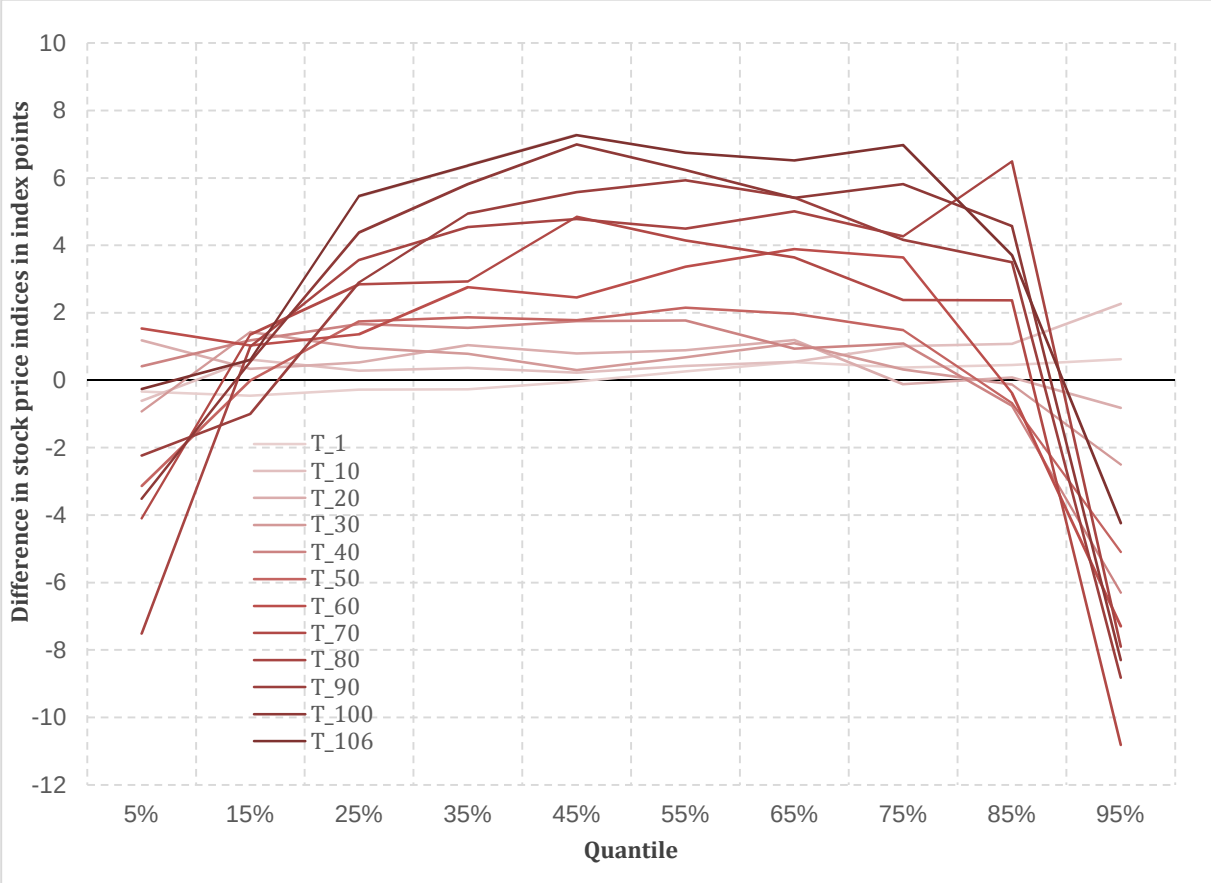
Exhibit 2.1| Sample composition of listed real estate companies with sustainability reports since 1999



The pie chart illustrates the final sample structure.
Source: Own illustration.

The data covers three continents: Europe with the largest share of 60.2 %, followed by North America with a share of 29.5 % and Australia with the smallest share of 10.2 % (exhibit 2.1). For European companies, the UK exhibits the highest share of about 15.9 %, followed by Germany and Sweden with 8.0%, each. The North American sample consists of United States with 22.7 % and Canada with around 6.8 %. For this final short list we started a double approach: Firstly, we used the publication data on the GRI website and secondly, the publication data on the companies' homepages, i.e. the companys' press release. For the time period 1999 till 2014 we identified 227 (71.2 %) GRI publication observations and 92 (28.8 %) corporate press releases.

Exhibit 2.2| The distribution of the impact of sustainability report release on companies' stock price index



For this analysis, the total return index of each observed real estate company was set to 100 at the event day - the release of their sustainability report. We then calculated the difference in the stock price index after and before the event for each of the 89 real estate companies. Since our investigation window is of 106 days, we report only 12 periods. The plot shows the distribution of the differences across several quantiles for each of the chosen window starting in 1 day and ending in 106 days. A positive difference in a specific quantile indicates that the total return index was higher after the report-release compared to the same period of time before the report release.
Source: Own illustration.

The illustration 2.2 shows the distribution of the differences (after minus before sustainability report release) of the total return index for every observation on the first day after release, in ten days steps and on the last six days of the investigation window. This first simple descriptive analysis shows that the release of sustainability reports has a substantial impact on the total return index across the sample, considering both the press as well as the GRI-release date. The analysis shows that for about 70 % of the observations the difference in the total return index for after report release compared to before report release was positive. The positive effect on returns is getting more evident that is stronger the further you go from the event date. Thus, after 106 days almost 70 %

of the observations had a return index value between +0,6 and +3,7 on average. Ten days after the report release 90 % of all observations show a positive value of the after minus before total return index. This result is also a first evidence for the market efficiency hypothesis as new information – the release of sustainability report – is incorporated into the share prices shortly (2 days) after the event date (McWilliams/Siegel, 1997; Lloyd Davies/Canes, 1978).

2.4 Research methodology

2.4.1 Preliminary steps

Fama et al. (1969) have decisively influenced the research on the impact of new, publicly available information on the stock prices. Ever since, event studies are an integral part of economic research as the main goal is to determine the effect of new information on the market value of a company. From this, it can be derived whether the information is of decision-usefulness to shareholders or not. Event studies are conducted under the premise that the considered capital market processes publicly available information quickly and (almost) completely. This premise is based on the hypothesis of efficient capital markets formulated by Fama (1969): „*The primary role of the capital market is allocation of ownership of the economy's capital stock. In general terms, the ideal is a market in which prices provide accurate signals for resource allocation: that is, a market in which firms can make production-investment decisions, and investors can choose among the securities that represent ownership of firms' activities under the assumption that security prices at any time fully reflect all available information. A market in which prices always fully reflect available information is called efficient.*". This semi strict informational efficiency is given on the market if all publicly available information is displayed immediately and completely in the current market price. Overall, many research studies indicate that there is a latent semi-strict information efficiency in all major capital markets (Spremann, 2006), which is the basic assumption in event studies. Thus, the influence of a piece of information on corporate value can be read from the share price reaction upon information notice. Since discounted cash-flow methods are dependent on internal data as well as company individual risk perception, event studies provide a wide and more objective mean for the estimation of capital market reactions (McWilliams/Siegel, 1997).

The first event studies – whose methodology remains basically valid – were undertaken by Ball et al. (1968) and Fama et al. (1969) and essentially evaluate the impact of profit reports and stock splits on capital markets. More precisely, they analyze the influence of profit reports on the excess returns calculated according to the market model. The rationale behind it is that if abnormal returns were observable, they might presumably incorporate the information relevant for the single company. This research study's application of the event study method is undertaken in accordance to the procedure introduced by MacKinley (1997). Generally, the method can be divided into the following steps:

1. Identification of the event and event window
2. Modeling and estimating the share price reaction
3. Sum up and interpretation of the abnormal returns

2.4.2 Identification of event and event window

We define the event as the date of the publication of sustainability reports. However, we do not differentiate between reports compiled according to GRI G3 or G4 framework or sustainability reports compiled according to an own company specific framework. But we do consider two different release dates: firstly, the date when the report is published in the GRI database – hence accepted by the GRI – and secondly, the release date by the company via the firm's internal press release. The most crucial research design aspect in event methodology is probably the issue concerning the length of the event window. The main reason for this is the increasing probability for overlapping or parallel events, resulting in biased results. Therefore, we decided for an event window of 106 days before and 106 days after the event in daily steps covering a total period of 91 trade days. This event window length seems ideal for this research and is in accordance to the results of McWilliams/Siegel (1997) as they analyzed different event studies on sustainability finding that the event periods chosen ranged symmetrically up to 181 trading days. However, the smaller the event window is the lower the risk of confounding events and thus the more accurate the results. (Gebken, 2008; Peterson, 1987)

2.4.3 Modelling and estimating share price reaction

In order to assess the impact of a GRI report release on the stock price it is necessary to measure the (cumulative) abnormal returns. Conceptually, the event analysis differentiates between returns that would have been expected in the absence of the analyzed event (normal or expected returns) and returns that are caused by the respective event (abnormal returns). Hence, the abnormal return over the event period corresponds to the actually observed return of a security in the capital market less the estimated return of the security over the event period. For the firm i at the event date t the abnormal return can be described as

$$AR_{i,t} = R_{i,t} - \hat{R}_{i,t} \tag{I}$$

, where $AR_{i,t}$, $R_{i,t}$ and $\hat{R}_{i,t}$ are the abnormal, actual and normal (estimated) return respectively. Though this might seem trivial, among researchers it is common knowledge that the research outcomes depend on the proper estimation of the normal (expected) return. The tremendous body of models can be generally grouped into two categories: statistical and economic models. While models in the first category rely mainly on statistical assumptions, models in the second category take in addition assumptions regarding the investor's behavior into account for a more precise estimation of the normal returns. However, research has proven that the additional factors do not go along with higher explanatory power resulting in an almost ceased usage of economic models (MacKinley, 1997). Thus, the most important statistical methods within the event study methodology are the simple constant-mean model and the prevalent market model which differ mainly in the underlying assumption of the behavior of asset returns. The constant mean model is based on the assumption that the best predictor of a company's normal return is the company's average security return prior to the event window. According to this model the normal period-t return of a security i can be described as

$$\widehat{AR}_{i,t} = R_{i,t} - \bar{\hat{R}}_{i,t} = \frac{1}{T}\sum_{t=1}^{T} R_{i,t} + \varepsilon_{i,t} \tag{II}$$

Hence, the normal expected return $\bar{\hat{R}}_{i,t}$ of security i is equal to the average return, meaning it is constant during the estimation period as well as the event window. $\varepsilon_{i,t}$ is a noise term for security i, with an expected mean $\mu(\varepsilon_{i,t}) = 0$ and variance $var(\varepsilon_{i,t}) =$

$\sigma^2_{\varepsilon_{i,t}}$. Despite its simplicity the constant-mean model is expected to generate similar results as more complex models (Brown/Warner, 1985; Brown/Weinstein, 1980).

One of the most prevalent approaches in event study methodology is the market model since evidence has suggested that the market model will perform in most circumstances as well as if not better than any other alternative (Armitage, 1995). Generally, for statistical models it is required that asset returns are jointly multivariate normal, independent and identically distributed over time as explained by Campbell et al., 1997. Consequently, the normal return for any given security *i* is according to the market model defined as

$$\hat{R}_{i,t} = \hat{\alpha}_i + \hat{\beta}_i R_{m,t} + \varepsilon_{i,t} \quad \text{(III)}$$

, whereby $\hat{R}_{i,t}$ and $R_{m,t}$ are the estimated normal period-t returns of the asset i and the market return m respectively. $\varepsilon_{i,t}$ is the error noise term with $\mu(\varepsilon_{i,t}) = 0$ and $var(\varepsilon_{i,t}) = \sigma^2_{\varepsilon_{i,t}}$. The basic idea of the model is the division of the normal return into two components: In a particular market driven return component and a security specific component, meaning a firm-specific depending return. Hence, the market model incorporates the security's sensitivity to market movements into the prediction of the normal return and relates the return of any given asset to the return of the market portfolio (MacKinley 1997). This asset specific sensitivity to the market movements is measured by the estimated regression via OLS over an estimation window of 91 trading days. In order to determine the market return a benchmark is required. Brown and Warner (1980) indicate that the choice of the benchmark has a significant effect on the results of the event study. We use for the determination of the market return the main broad market indices of the respective country such as DAX, CAC, S&P, FTSE, etc. The abnormal returns $\widehat{AR}_{i,t}$ for a security i at time t are calculated as follows:

$$\widehat{AR}_{i,t} = R_{i,t} - \hat{R}_{i,t} = R_{i,t} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t}. \quad \text{(IV)}$$

2.4.4 Aggregation and testing statistics for the significance of abnormal returns

After calculating the abnormal returns $\widehat{AR}_{i,t}$ for all i securities over the event window t, it is necessary to aggregate these abnormal returns in order to test for their significance and if inferences can be drawn. By the concept of cumulative returns, multi period event windows can be accommodated and therefore, in order to test for significant abnormal

returns the $[i \times t]$ matrix containing the $\widehat{AR}_{i,t}$ can be aggregated firstly over time across the event window t, cross-sectionally across each company i or lastly across both company i and time i (Fama et al., 1969). The Cumulative Abnormal Return ($\widehat{CAR}$) aggregates the abnormal returns for each company over time. This is within the event window beginning in T_1 and ending in T_2 as follows:

$$\widehat{CAR}_i(T_1, T_2) = \sum_{t=T_1}^{T_2} \widehat{AR}_{i,t} \tag{V}$$

with

$$var\left(\overline{\widehat{CAR}}(T_1, T_2)\right) = \sum_{t=T_1}^{T_2} var(\overline{\widehat{AR}}_t) \tag{VI}$$

In other words, the cumulative abnormal return is the sum of all abnormal returns during the event window. The calculation of $var\left(\overline{\widehat{CAR}}(T_1, T_2)\right)$eliminates overlapping events and sustains the assumption of uncorrelated abnormal returns between the distinctive observations. The mean abnormal returns of all companies at each point of time over the event window are calculated as:

$$\overline{\widehat{AR}}_t = \frac{1}{N}\sum_{i=1}^{N} \widehat{AR}_{i,t} \tag{VII}$$

with

$$var\left(\overline{\widehat{AR}}_t\right) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_{\varepsilon_i}^2 \tag{VIII}$$

Hence, the cumulative average abnormal return $\overline{\widehat{AR}}_t$ is calculated as the sum of all securities' abnormal returns divided by the number of observed securities. This is similar to an equal weighting of the N securities. Hence after each period t, the securities are redistributed, meaning that securities with higher return are sold in the following period to buy securities with relatively low return. The aggregation of the cumulative abnormal returns over time and securities, that is, the impact of the event over the event window, is calculated the following way:

$$\left(\overline{\widehat{CAR}}(T_1, T_2)\right) = \frac{1}{N}\sum_{i=1}^{N} \overline{\widehat{CAR}}_i\,(T_1, T_2) \qquad \text{(IX)}$$

with

$$var\left(\overline{\widehat{CAR}}(T_1, T_2)\right) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_i^2\,(T_1, T_2) \qquad \text{(X)}$$

Given that the abnormal returns are expected to be normally distributed, it is possible to conduct a test under the null hypothesis of zero mean. The testing procedure includes the calculation of the test statistics, the comparison of it to the assumed distribution under the null hypothesis that the average abnormal return is equal to zero. Mainly, the following null hypotheses are tested:

$$\Phi^1 = \frac{\mathrm{CAR_i}(\mathrm{T_1}, \mathrm{T_2})}{\sqrt{\sigma^2(\mathrm{CAR_i}(\mathrm{T_1}, \mathrm{T_2}))}} \sim \mathrm{N}(0,1)$$

The null hypothesis Φ^1 tests whether the cumulative abnormal return for every security i is significantly different from zero ($\mu = 0$).

$$\Phi^2 = \frac{\overline{\mathrm{AR_i}} - \mu}{\sqrt{\sigma^2(\overline{\mathrm{AR_t}})}} \sim \mathrm{N}(0,1)$$

The null hypothesis Φ^2 tests whether the average abnormal return at a specific time period t is significantly different from zero.

$$\Phi^3 = \frac{\overline{\mathrm{CAR}}(\mathrm{T_1}, \mathrm{T_2}) - \mu}{\sqrt{\sigma^2(\mathrm{CAR_i}(\mathrm{T_1}, \mathrm{T_2}))}} \sim \mathrm{N}(0,1)$$

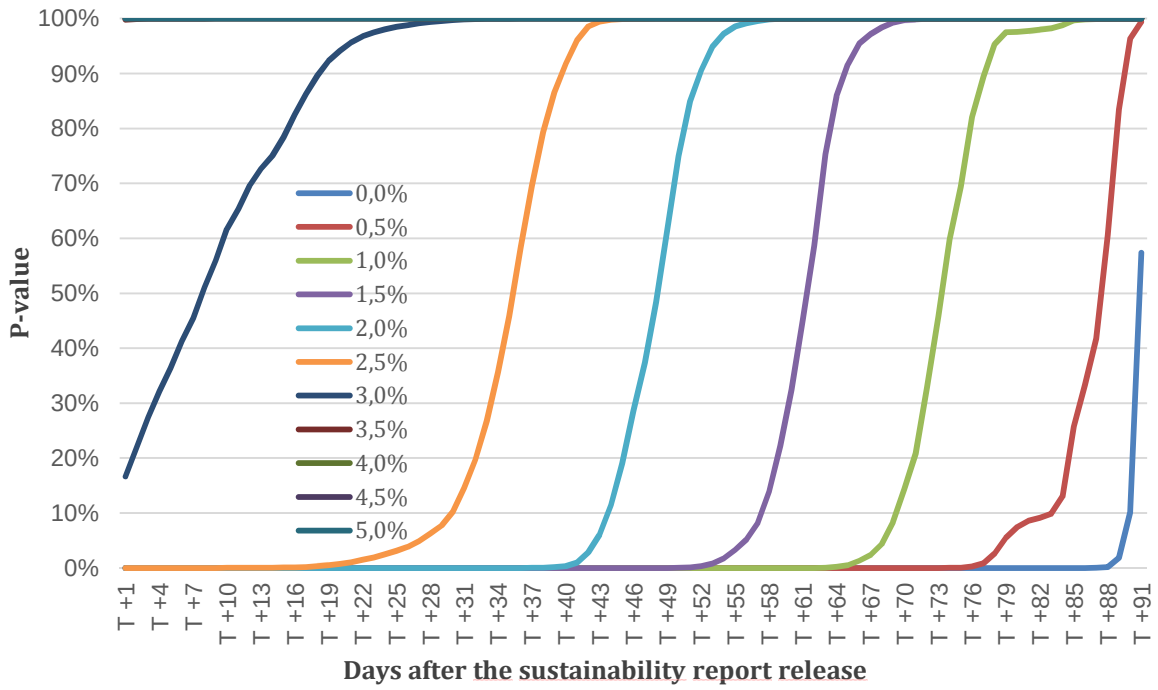
The last null hypothesis tests for the whole matrix of cumulative abnormal returns whether it is statistically significantly different from zero or not.

2.5 Empirical results

The prevalent significance test for event study methodology is the t-test with the assumption of uncorrelated and equally distributed residuals. The t-test can be undertaken not only to test the significance from zero but also to test on higher values, also called power or objective value μ. The power μ addresses the issue of likelihood of rejecting the null-hypothesis for a specific value of abnormal return associated with the event. The economic plausible abnormal return range is driven from the descriptive analysis which indicated that the difference in total return index from after minus before sustainability report release was around 3.5 index points. Hence the objective values to be tested for are set from 0 % to 5 % in 0.5 % steps.

Assuming a one sided t-test under the null of CARs greater than the respective objective values, the results of the hypotheses Φ^1 are illustrated in exhibit 2.3.

Exhibit 2.3| Statistical significance of CAR by reasonable range of objective values across time



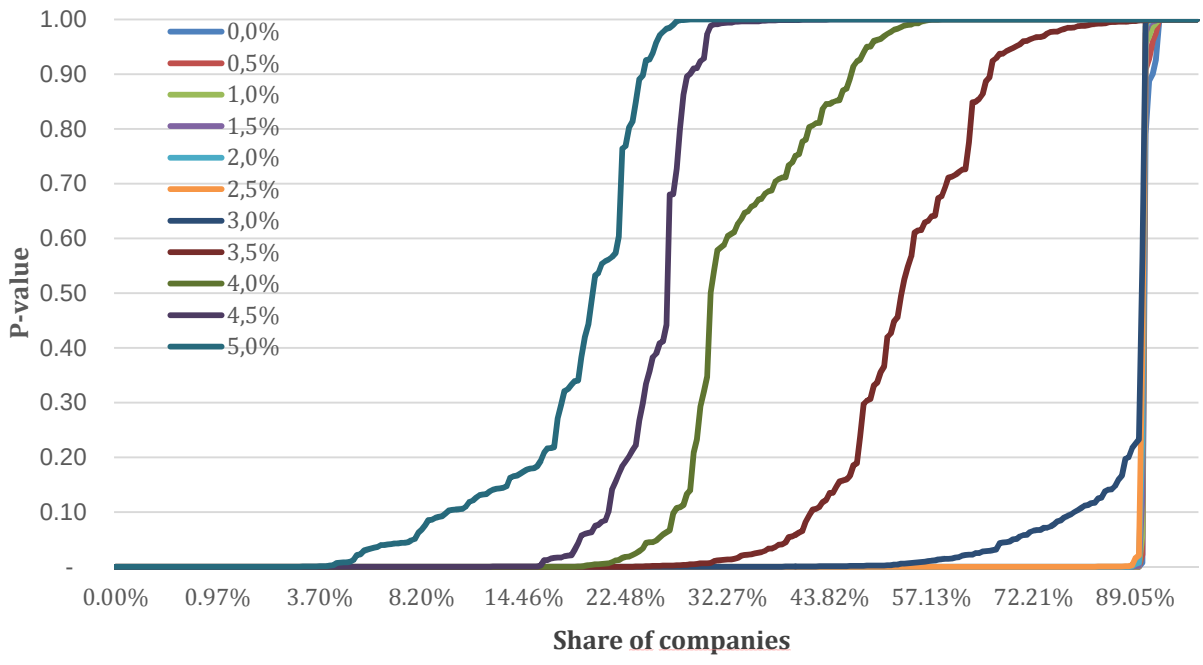
The null hypothesis to be tested is H_0: $CAR > 0$; that is, the event of releasing sustainability reports has a impact on corporate share returns across the event window T_1 to T_2. For this the abnormal returns of the 89 companies of the sample have been aggregated over the event window for all companies in t+1, t+2 + …+ t+91 days after the sustainability report release. The ordinate indicates the p-values for rejecting the

null. Hence, each line represents the p-value for the null-hypothesis given an objective return being greater than the indicated economically reasonable abnormal return range between 0 % and 5 % in 0,5 % steps. The subsequently undertaken t-test shows that the results are significantly different from zero.
Source: Own illustration.

Each of the lines in exhibit 2.3 shows the p-value of rejecting the hypothesis that cumulative returns are greater than the respective objective values in relation to the days after the release of the sustainability report. Hence, for example the hypotheses that the CAR is greater than 1.0 % can be rejected after 70 days of the report release date. The hypothesis that the CAR over time is higher than 3 % can be already rejected after 29 days after the sustainability report release. In other words, 70 days after the release of a GRI-report listed real estate companies exhibit a cumulative abnormal return of at least 1 % and of at least 3 % after almost 30 trading days.

These results can be confirmed not only over time but also by the evidence from the t-test Φ^2 for the cross-sectional sample. Exhibit 4 illustrates the results of the t-test for the statistical significance of the cumulated returns by the objective values 0 % to 5 % in 0.5 % steps for all listed real estate companies.

Exhibit 2.4| Statistical significance of cumulated abnormal returns for a range of objective values across companies



Undertaking the t-test across the 89 companies was initiated with the cross-sectional aggregation of the cumulative abnormal returns for the sample. The objective value range is 0 % to 5 % in 0.5 % steps. The ordinate shows the p-values and the y-axis the share of the companies.
Source: Own illustration.

Each line in the exhibit 2.4 shows the p-value of rejecting the hypothesis that firm's cumulative returns are greater than the respective objective values sorted by the share of companies. In other words, for almost 90 % of the companies the hypothesis that the release of a GRI-report leads to CARs below 2.5 % cannot be rejected. In contrast, only 10 % of the real estate firms show a statistical significant CAR above 5 %, which is not likely in in view of the results exposed in the descriptive statistics. However, almost 75 % of the observed firms show a significant CAR of at least 3 %. These results emphasize the importance of information on sustainability activities as an active part of firms' strategy to both internal and external stakeholders, which result in increased growth expectations by investors and capital markets.

Finally, we present the empirical results for the entire sample regardless of the individual heterogeneity or time-series component, i.e. the t-test for the null-hypothesis Φ^3. Over the entire sample, the hypothesis that the release of sustainability reports has no influence on corporate value can be rejected at all conventional significance levels. More precisely, the result holds up to an objective value of CAR below 2.0 % for the entire sample and confirms that the inclusion and communication of sustainability strategies has a significant impact on stock returns, based on a sample of 89 listed real estate companies and 318 events.

Exhibit 2.5| The significance of cumulative abnormal returns across time and company

Objective Value	All Sample	
	T-Value	P-Value
0.0 %	23.992	0.00
0.5 %	20.155	0.00
1.0 %	16.317	0.00
1.5 %	12.480	0.00
2.0 %	8.643	0.00
2.5 %	4.805	0.17
3.0 %	0.968	1.00
3.5 %	-2.869	1.00

The t-test for the 318 observations of the 89 companies over the event window of 106 days. The p-values show significance at all level, thus the one-sided null-hypothesis of no impact can be declined. The objective values or power test the significance of the indicate value of the abnormal returns.
Source: Own illustration.

2.6 Conclusion

The inclusion of sustainability aspects into core firms' strategy is becoming more and more the rule rather than the exception, especially in the real estate industry as it accounts for a large part of the final energy consumption and greenhouse gas emissions worldwide. In this context, the efficient communication of sustainability strategies and efforts is normally undertaken by sustainability reports, based mainly on the international regulatory framework of the Global Reporting Initiative, GRI. In a market, in which information is priced efficiently, additional information on companies' long-term strategies should reduce asymmetries between the company and its stakeholders and lead to stronger valuation. If the release of sustainability reports provides additional information, then we should expect a positive impact on corporate value. Based upon these fundamentals, the paper analyzes the impact of sustainability reports on corporate value. The descriptive and empirical analyses provide significant evidence for the value contribution of sustainability reports. Specifically, we reject the hypothesis that sustainability reports have no impact on the market value of listed real estate companies and establish a robust increase in abnormal returns of at least 2 % for about 75 % of the listed real estate companies. This positive effect is robust even when considering individual and serial heterogeneity into the statistical models. Hence, the positive results on the empirical level provide evidence that sustainable reports convey information useful for company (e-)valuation. They provide highly significant results for the market efficiency hypothesis and at the same time that the real estate market is efficient in the sense that new information are incorporated into the share prices within a short event window.

Considering the costs of preparation sustainability reports, the results of this research prove the payoff of such efforts. Therefore, investments in corporate sustainability can also be seen as an investment in the corporate performance as corporate sustainable behavior is rewarded by the market with higher stock values. Thus, the presented results could be a trigger for further sustainability efforts of the real estate sector.

2.7 References

Albers, C./Guenther, T. (2010), "Disclose or Not Disclose: Determinants of Social Reporting for STOXX Europe 600 Firms", Zeitschrift für Planung & Unternehmenssteuerung, Vol 21 No. 3, p. 323-247.

Alonso-Almeida, M.M. (2009), "Use of ICTs to generate trust in shareholder and investors in companies", Argos, Vol. 26 No. 51, p. 6-26.

Armitage, S. (1995), "Event study methods and evidence on their performance", Journal of Economic Surveys, Vol. 9 No. 1, p. 25-52.

Bauer, R./Koedijk, K./Otten, R. (2005), "International evidence on ethical mutual fund performance and investment style", Journal of Banking & Finance, Vol. 29 No. 7, p. 1751-1767.

Brown, S. J./Warner, J. B. (1980), "Measuring Security Price Performance", Journal of Financial Economics, Vol. 8 No. 3, p. 205-258.

Brown, S. I./Weinstein, M. I. (1985), "Derived factors in event studies", Journal of Financial Economics, Vol. 14 No. 3, p. 491-495.

Brundtland Report (1987), "Report of the World Commission on Environment and Development: Our Common Future", Brussels 1987.

Cajias, M./Bienert, S. (2011), "Does Sustainability pay off for European Listed Real Estate Companies? The Dynamics between Risk and Provision of Responsible Information", Journal of Sustainable Real Estate, Vol. 3 No. 1, p. 211-231.

Cajias, M./Geiger, P./Bienert, S. (2012), "Green agenda and green performance: empirical evidence for real estate companies", Journal of European Real Estate Research, Vol. 3 No. 2, p. 135-155.

COM – Commission of the European Communities (2001), "Green Paper – Promoting a European Framework for Corporate Social Responsibility", COM (2001) 366 final, Brussels 2001, p. 1-32.

COM – Commission of the European Communities (2011), " A renewed EU Strategy 2011-14 for Corporate Social Responsibility, COM (2011) 0681 final, Brussels 2011.

Dilling, P.F.A. (2009), "Sustainability reporting in a global context: What are the characteristics of corporations that provide high quality sustainability reports? – An empirical Analysis", International Business & Economics Research Journal, Vol. 9 No. 1, p. 19-31.

Eurosif, European SRI Study 2014, p. 34.

Fama, E. F./Fisher, L./Jensen, M. C./Roll, R. (1969), „The adjustment of stock prices to new information", International Economic Review, Vol. 10 No. 1, p. 1-21.

Gamerschlag, R./Moeller, K./Verbeeten, F. (2010), „Determinants of Voluntary CSR Disclosure: Empirical Evidence from Germany", Review of Managerial Science, Vol 4, p.1-30.

Gebken, T. (2008), "The Dynamics within Merger Waves: Evidence from the Industry Merger Waves of the 1990s", Doctoral Thesis, European Business School Oestrich-Winkel.

Geczy, C./Stambaugh, R. F./Levin, D. (2005), "Investing in Socially Responsible Mutual Funds", Available at SSRN 416380.

Gilbert, D.U./Rasche, A. (2007), "Discourse ethics and social accountability: the ethics of SA 8000", Business Ethics Quarterly, Vol. 17 No. 2, p. 187-216.

Global Reporting Initiative (2002), „Sustainability reporting guidelines on economic, environmental and social performance", Boston: Coalition for Environmentally Responsible Economies.

Krajnc, D./Glavi, P. (2005), "A model for integrated assessment of sustainable development", Resources, Conservation and Recycling, Vol. 43, p.189-208.

Laufer, W. S. (2003), "Social Accountability and Corporate Greenwashing", Journal of Business Ethics, Vol. 43 No. 3, p. 253-261.

Lee, M.D.P. (2008), "A review of the theories of Corporate Social Responsibility: its evolutionary path and the road ahead", International Journal of Management Reviews, Vol. 10 No. 1, p. 305-328.

Lloyd Davies, P./Canes, M. (1978), “Stock prices and the publication of second-hand information”, Journal of Business, Vol. 51, p. 43–56.

MacKinley, A.C. (1997), “Event Study in Economics and Finance”, Journal of Economic Literature, Vol. 35, p.13-35.

McWilliams, A./Siegel, D. (1997), “Event studies in management research: Theoretical and empirical issues”, Academy of management journal, Vol. 40 No. 3, p. 626-657.

Melé, D./Debeljuh, P./Arruda, M.C. (2006), “Corporate ethical policies in large corporations in Argentina, Brazil and Spain”, Journal of Business Ethics, Vol. 63, p. 21-38.

Murray, A./Sinclaire, D./Power, D./Gray, R. (2006), “Do financial markets care about social and environmental disclosure?”, Accounting, Auditing and Accountability Journal, Vol. 19 No. 2, p. 228-255.

Münchner Rückversicherungsgesellschaft (2013), “Topics Geo: Natural catastrophes 2012 – Analyses, assessments, positions“, Munich, p. 40.

Nelson, A./Rakau, O./Doerrenberg, P. (2010), „Green Buildings – A Niche becomes Mainstream“, RREEF Research.

Peterson, P.P. (1989), “Event Studies: A Review of Issues and Methodology”, Quarterly Journal of Business and Economics, Vol. 28 No. 3, p. 36-66.

Ramus, C.A./Montiel, I. (2005), „When are corporate environmental policies a form of greenwashing?”, Business Society, Vol. 44 No. 4, p. 377-414.

Sharpe, W.F. (1963), “A simplified model for portfolio analysis”, Management Science, Vol. 9 No. 2, p. 277-293.

Sherman, W.R. (2011), “The global reporting initiative: what value is added?”, International Business & Economics Research Journal, Vol. 8 No. 5, p. 9-22.

Skouloudis, A./Evangelinos, K./Kourmousis, F. (2009), “Development of an evaluation methodology for triple bottom line reports using international standards on reporting”, Environmental Management, Vol. 44, p. 298-311.

Spreemann, K. (2006), “Portfoliomanagement”, 3rd Edition, Munich, p. 161.

Turcsanyi, J./Sisaye, S. (2013), “Corporate Social Responsibility and its link to financial performance – Application to Johnson & Johnson, a pharmaceutical company”, World Journal of Science, Technology and Sustainable Development, Vol. 10 No. 1, p. 4-18.

UNEP Sustainable Buildings & Climate Initiative (2009), “Buildings and Climate Change – Summary für Decision-Makers”, Paris, p. 2.

Weber, M. (2008), “The business case for Corporate Social Responsibility: A company level measurement approach for CSR”, European Management Journal, Vol. 26, p. 247-261.

3 Management diversity and superior corporate environmental performance – a global longitudinal analysis with special evidence for real estate companies

3.1 Introduction

The global fragility is more than ever obvious in today's world of accelerating anthropogenic climate change, resource scarcity, and global financial and political interdependencies. As a result, Corporate Social Responsibility (CSR) flourished to one of the key challenges of today's society and business world, remaining at the forefront of public, political and corporate agenda. In particular, environmental sustainability is by far the most important CSR pillar with direct impacts on livelihood. Especially, sectors with high environmental impact like the real estate industry play a prominent role: According to an OECD study, the real estate and construction sector is one of the main determinants of resource scarcity and advancing climate change. The sector is responsible for 25 – 40 % of global energy consumption, about 30 % of resource consumption, 30 – 40 % of waste generation and 20 % of global drinking water consumption (OECD, 2003). Furthermore, population growth triggers construction activities and results in a progressively tightened environmental problem. As a result, the United Nations predict a doubling of greenhouse gas emissions caused by construction activities (UNEP, 2009). Hence, it is certainly no big surprise that over the last decades, a holistic sustainability approach – that is the simultaneous consideration of all three sustainability dimensions: environmental, social and economic/governance – and in general sustainable development have grown to one of the major challenges for business world (Melé et al., 2006; Skouloudis et al., 2009). At the same time, investors increasingly consider sustainability in their investment decisions, resulting in disinvestments in carbon intense sectors and increasing volumes of Socially Responsible Investments (SRI) (UNEP, 2009; Leaton et al., 2013; GSIA, 2014; Schuwerk and Weber, 2015). As such, in the past two years the global SRI market experienced strong growths. In relative terms, the proportion of sustainable assets rose from 21.5 % to 30.2 % of the professionally managed assets. In absolute terms, global SRI investments rose from 13.3 trillion USD at the beginning of 2012 to 21.4 trillion USD at the beginning of 2014, marking an increase of 61 % (GSIA, 2014). Also, other research studies provide evidence

that the demand for SRI is rapidly growing, i.e. the proportion of capital invested in ethical funds has increased tremendously (Geczy et al., 2003; Bauer et al., 2005).

Despite the increasing importance of environmental sustainability, in practice, there are large differences between companies concerning corporate environmental sustainability performance. Gender diversity is one of the potential reasons for these divergences addressed in research. In particular, empirical evidence predominantly focuses on the sustainability impacts of gender-diverse-board-of-directors. The debate is based on the perception that female board members affect CSR and financial performance by influencing the corporate governance. Underpinning, early voices of the stakeholder theory such as Freeman (1984, 2004) or Cornell and Shapiro (1987) argue that the corporate upper echelon is obliged to satisfy the needs of all stakeholders in order to increase firm value. According to this stakeholder maximizing view, corporations are suggested to align the managements' interests with those of its stakeholders in order to achieve value maximizing goals. Thus, a heterogeneous board can reflect the diverse stakeholders' needs and disregarding these needs might result in reputational as well as financial losses. Another rationale goes further, putting emphasize on board effectiveness that in turn is accomplished by a diverse rather than homogenous board composition. In the broadest sense, a diverse board comprises individuals with differing backgrounds, sets of experiences, gender, knowledge, age, status etc. The combination of these characteristics is assumed to promote effective group dynamics and decision-making processes. Since women are attributed caring traits and higher consciousness for sustainability, they might increase the awareness for and promote decisions in favor of higher sustainability, when serving on the board of directors. As a result, this gender parity is assumed to increase the board's effectiveness concerning CSR (Harjoto et al., 2015).

However, this is only one stream of argumentation praising the positive impacts of gender parity. The other main argumentation line is based on the perception that women should be on the board of directors out of ethical and equality reasons. Although, in the past decades the gender gap in educational attainment and achievement could be closed, highly qualified and experienced women are still underrepresented in top positions. For example, in the U.S. about 50 % of the law school and up to 30 % of the MBA graduates are women, however, in 2011, only 16 % of the board members were female (Azmat, 2014). Accordingly, from a policy perspective, gender quotas will be needed if companies do not implement changes in top positions voluntarily. This heated

debate of the parties for and against legislatively determined female board quotas is the reason why the whole subject becomes difficult and remains one of the most controversial aspects of board composition in the public and business world. As such, in the past decade, there was a strong impetus in various countries in the world to increase gender diversity in board rooms of publicly traded corporations. Triggered by dedicated legislative initiatives around the world, numerous attempts were implemented in order to increase the pressure for higher board gender diversity. For Europe, the European Commission proposed the introduction of a mandatory female board quota of 40 % for the position of non-executive directors in 2012 (European Commission, 2012). However, the measures of promoting board gender diversity vary considerably among countries. The strictest regulations are to find in Norway, where the government introduced a mandatory quota of 40 % for women on the board of directors in 2006. Also other countries like France, Spain and Belgium followed this example. While Italy and Belgium set a minimum gender quota of 30 % to be realized by 2015 and by 2019, respectively, the French government determined in 2011 a minimum of 20 % female board members to be reached by 2014 and a quota of 40 % by 2017. While some countries like UK or Spain prefer a voluntary approach, in others like France and Italy, non-compliance is followed by sanctions. Also, besides European borders, there is a broad agreement on the desirability of gender diversity in board rooms. As such, mandatory as well as voluntary initiatives can be found: For instance, in India and Israel companies are required to have at least one woman on each board room. In Malaysia, 30 % female board members are to be fulfilled for new appointments. For the UK and the U.S.A. mandatory requirements do not really work, which is why they are trying to meet the issue by heated debates, causing policy makers to introduce some measures open to voluntary participation. Surprisingly, in these countries the percentage of female board members increased without legislative pressure. However, it is not clear, whether in these cases, the public pressure and/or the international competitiveness for investors initiated the process of rethinking and adaptation.

Nevertheless, one of the major problems of gender quotas and forced board gender diversity remains tokenism since in practice; it is still very rare for firms to have more than one female board member – the so called *token woman* effect. Furthermore, quotas on gender mainly refer to non-executive board positions. Also, in practice women are still more likely than men to have outside director positions (Post and Bayron, 2015;

Adams and Ferreira, 2009). Though, these directors are having a range of controlling and advising functions, the active management is still a predominantly male domain.

Concerning research, a bulk of scientific work focuses on the financial performance implications of board gender diversity, however, the results remain ambiguous. Also, when it comes to sustainability effects of diversity, the research output is still scarce. Hence, there is not only a research gap concerning the effects of board gender diversity on corporate CSR performance but also a gap on circumventing the effects of tokenism, a potential field for bias. This study is devoted to the environmental sustainability impacts of gender diversity on board and subordinated management level with focus on three new dimensions of sustainability determinants: 1) Gender diversity in decision-making management positions, 2) real estate industry as highly environmental impact sector and 3) first time analysis of 4 dimensions of environmental sustainability – it is to our best knowledge the first of its kind. By focusing on gender diversity in decision-making management levels, distorting effects of tokenism are circumvented. Furthermore, using a broad panel data set of 3,528 and various diversity and sustainability scores of the Asset4ESG rating by Thomson Reuters, the analysis results show positive impact of female management on corporate environmental sustainability performance. In particular, gender diverse management promotes environmental product innovation and especially for the real estate and construction industry, it supports corporate emission reduction. Thereby, the effect of management diversity is by far higher than the effects of board level diversity, underpinning the assumption of tokenism.

The remaining of the paper is structured the following way: The first section provides some theoretically oriented background information on sustainability and diversity followed by the hypotheses and a sample as well as a methodical description. The hereafter following section focuses on the sample statistics and leads to the discussion of the results. Finally, robustness check and conclusion mark the end of the paper.

3.2 Literature review

3.2.1 CSR and sustainable development

The concept of Corporate Social Responsibility roots in the 1987 evolved idea of sustainable development by the Brundtland Commission (formally the World Commission on Environment and Development). Therein, the Commission defined sustainable development as a development that meets the needs of the present

generations without compromising the ability of future ones to meet their own needs (Brundtland Report (1987)). The corporate contribution to sustainable development can be outlined by the CSR concept that is most commonly defined as "*a concept whereby companies integrate social and environmental concern in their business operations and in their interaction with their stakeholders on a voluntary basis*" (COM 2001, 366). Further, CSR involves actions that are over and above the corporate legal obligations towards environment and society (COM 2011, 0681). In a nutshell, CSR comprises a company's environmental, social and economic activities that have direct or indirect effects on the corporate business as well as its stakeholders (Turcsanyi and Sisaye, 2013).

Environmental sustainability is an important dimension of CSR whose disregard such as growing global energy consumption or increasing air pollution by partly unrestricted CO_2 emissions has hazardous impacts on the environment (e.g. melting ice caps, droughts and floods, resource scarcity etc.) that are already in evidence. Especially, multinational corporations and companies with high emissions are identified as the main contributors to these developments. Moving into the focus of societies' attention, critical voices asked increasingly for greater restraints of unelected corporate growth aspirations. This growing public and political awareness for sustainability has a signaling effect for corporations to consider the requirements and needs of these stakeholders. Creating and maintaining a relationship with these groups is essential for building a competitive advantage in business (Jensen, 2001, 2002; Fisman et al., 2005; Baron, 2009; Harjoto et al., 2015). Ignoring these aspects and pursuing a strategy of business as usual would mean a threat to the survival of the company, especially, the nowadays excellent communication tools allow for instant information of stakeholders and for taking the polluter into account almost immediately. Also, from an economic point of view, the consequences of management failures are partly disastrous for the shareholders when their invested capital is literally burned down. A prominent example for such failures threatening the survival of the company is the emission scandal by Volkswagen AG, when shareholders had to face a loss of almost one-third in VW shares going along with massive compensation payments of more than 15 billion USD only in the US.[7] Other stakeholders such as consumers lost trust in the company leading to a slump in sales numbers of VW vehicles. Again the consequences of declining corporate revenues as well as lawsuits by environmental authorities have to be borne by the shareholders.

[7] https://www.ft.com/content/336c4db0-8874-11e6-8cb7-e7ada1d123b1.

Consequently, initially underestimated as a rather fashionable term, sustainability has gained importance and weight as one of the most popular concepts in the business world (Lee, 2008) with direct and indirect links to financial performance (Waddock and Graves, 1997; Flammer, 2015).

3.2.2 Theory and practice of gender diversity

The reason why gender diversity is en vogue roots in the conviction that gender diverse teams promote more efficient decision-making processes by providing a greater variety of ideas, values, perspectives and knowledge bases. It is assumed that these activities result in higher financial as well as Corporate Social Responsibility performance. However, this diversity issue remains subject to highly controversial debates. One major stream argues for gender diversity as the right thing to do from a political, ethical and rather equal-rights-oriented perspective. The other side of the debate advocating gender diversity from a value increasing perspective, argue that gender parity has a number of positive impacts on corporate governance, and accordingly, on the effectiveness of board of directors as a central corporate governance mechanism. First, women would provide a greater variety in opinions and views, hence leading to better decision-making processes in management teams. Therefore, diversity would also increase the creativity and innovation of the board (Carter et al., 2003). Also, gender diverse boards might be more effective leaders because homogeneous boards could suffer from a narrow view on the environment, future trends and challenges as well as sustainability. Furthermore, in contrast to homogenous groups, diverse groups might ask questions or be more courageous to contradict decisions and by this increase effective management monitoring (Carter et al., 2003). Besides, women on the board may improve the relationship management with important key stakeholder groups such as customers and employees, as been stated in a research study by Brammer et al. (2007).

Concerning legislative practice, recently, corporate governance codes in various countries mandated publicly traded corporations to adopt board practices related to diversity and to disclose these information according to the comply or explain principle, i.e. whether and how these board diversity requirements are implemented in the company. For example, the Higgs report (2003) in the UK states that gender diverse boards might increase board effectiveness and promote the implementation of diverse board structures. Other European countries like Norway lead the way by introducing a

mandatory 40 % female gender quota for all listed companies from 2008 on. Spain followed this example and also determined that all publicly listed companies must abide by 2015, 40 % female board directors. Also in Germany, the topic of obligatory gender quotas was debated controversially, resulting in a female director quota of 30 % (Credit Suisse Research Institute, 2014). Currently, the German DAX companies have on average 21 % female board directors. However, the business practice has shown that from a global perspective, in 2013 only 6.9 % of all companies have more than 30 % female board members. The regional comparison provides evidence, that Europe has the highest diversity with 19 % of the companies having more than 30 % female employees on board level followed by North America with 6 %. The lowest diversity can be found in LATAM countries (Credit Suisse Research Institute, 2014). This research study has also analyzed the impact of quotas in promoting higher gender diversity. The results show that the impact of quotas only remained within the borders of corporate board rooms. In fact, gender quotas are rather driving *'tokenism'* instead of increasing management quality and hence miss the target. Therefore, the following section determines how gender diversity despite board level quota could impact on corporate sustainability performance.

3.2.3 The role of diversity in CSR performance

In contrast to *'greenwashing'*, the main aim of CSR is to align a company's business purpose, i.e. its core business with its social, environmental and governance activities. According to common opinion, an effective board is also important from a sustainability point of view, since it pursues the implementation of stakeholders' sustainability aspirations by monitoring managerial actions and intervening with corrective actions, if necessary. Hence, for the value maximizing implementation, the effective group-dynamic and decision-making of the board of directors plays a major role. In turn, these desired team-outcomes are depending on characteristics and expertise of individual board members. According to Robinson and Dechant (1997) "*attitudes, cognitive functioning, and beliefs are not randomly distributed in the population, but tend to vary systematically with demographic variables such as age, race, and gender*". Thus, female directors can increase the board independency and in accordance with the agency theory, independent board members are better monitors. This good governance – also a highly appreciated and demanded investment criterion by investors (McKinsey, 2002) – is in

turn an undeniable positive criterion for corporate performance. Furthermore, female directors are assumed to have broader interest in philanthropy and community related activities (Groysberg and Bell, 2013) that have positive impacts on the promotion of corporate sustainability.

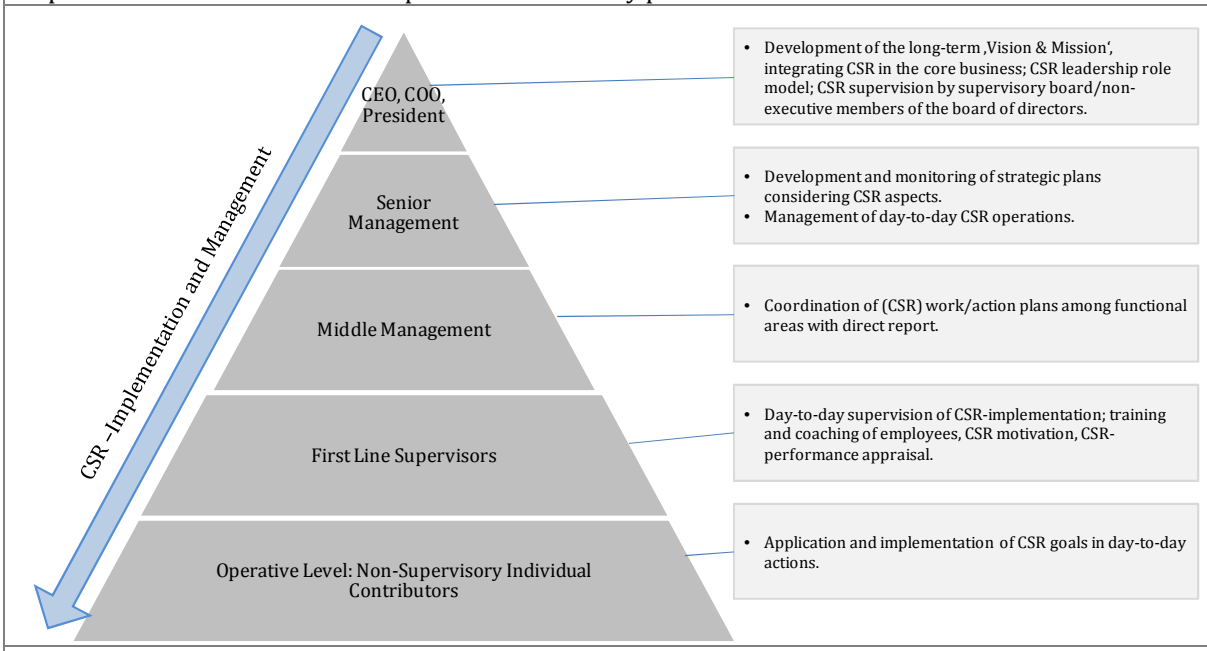
However, this is only one side of the coin: Increasing the number of women on board level and ignoring the gender diversity of management teams in middle and lower management does not necessarily increase shareholder value, since one of the severe problems in the discussion on board gender diversity remains tokenism (Branco and Patterson, 1999; Credit Suisse Research Institute, 2014). Aggravating, it is not only the tokenism of having just *one* female board member – according to Kramer et al. (2007) critical mass theory, a threshold number of at least three female board members triggers better corporate performance – but also the tokenism of having gender parity on board level but insufficient female representation in key middle and lower level management positions. Hence, it can be concluded that in *neither case*, the praised positive impacts of gender parity can be realized.

Furthermore, in order to maximize the positive impacts of sustainability, the implementation of the main corporate sustainability strategy should be in a first stage a top-down process and one of the essential duties of the corporate management from senior management to lower level management/first line supervisors as presented in the following management and diversity pyramid (exhibit 3.1):

Exhibit 3.1| CSR implementation and management level

The implementation of sustainability is a top-down process in the company. Gender diversity on all management levels can increase the effectiveness of the implementation process and consequently, the sustainability performance of the whole company.

The reason why the number of female managers makes a difference is that with increasing number of women in important, decision-making management levels, the management teams get diverse perspectives as well as opinions and break down the all-male communication patterns. This possible positive effect is undermined double-tokenism-effect: Firstly, having one female board member and secondly, having gender parity on board level but lacking women on subordinated management levels. Both results in tokenism with its effects such as the minor gender – mainly women – not speaking out or holding back critics. Hence, the problem with tokenism is that it prevents women from having actively an impact on team and in turn on corporate sustainability performance.



Source: Own illustration in accordance with ZIA (2015).

The implementation of sustainability starts with the board of directors setting up the overall corporate sustainable *'Vision & Mission'* while being supervised and advised by non-executive and supervisory board members. On this basis, the senior management level formulates the long-term corporate strategy, which in turn is broken down into short-term operational CSR-goals and action plans. The implementation thereof is coordinated by the middle management. The first line supervisors in turn oversee the day-to-day realization of these CSR targets and also coach and motivate employees to perform according to these goals. Hence, the proper execution of CSR goals set up by the corporate top management are in fact implemented and controlled by managers in senior and middle management and first line supervisors. Consequently, considering the gender diversity debate and the female board level quotas, it is quite obvious, that the de facto implementation of CSR board level targets are up to the subordinated management levels. Therefore, the sole number of female board members is mostly seen as tokenism

as long as important decision-making positions are all-male dominated. The important factor for CSR integration is the number of female managers in the senior, middle and lower management. Therefore, the coefficient effect of the regression results is expected to be higher compared to board gender diversity. Underpinning, the Credit Suisse Research Institute has shown empirically that especially in countries with board room gender quotas, the gap between board level diversity and following management diversity was the highest (Credit Suisse Research Institute, 2014).

3.2.4 Research results on diversity and sustainability

There is a bulk of research on board composition and financial performance (e.g. Carter et al., 2003; Adams and Ferreira, 2009; Johnson et al., 2013), and sustainability and financial performance (CSR reduces the cost of capital: Dhaliwal et al., 2011; Cheng et al., 2014 or CSR reduces the idiosyncratic risk: Luo and Bhattacharya, 2006; Oikonomou et al., 2012) the literature on board gender diversity and corporate sustainability performance is still scarce and ambiguous in results. One of the few studies in this context is undertaken by Ferrero-Ferrero et al. (2013). The authors have analyzed for the year 2009 and a total sample of 146 companies (UK, Germany and France) whether board diversity enhances the integration of ESG (Environmental, Social, Governance)-aspects in management systems. Thereby, generational differences are measured by dividing the board members into three age categories: Veterans (1922-1942), Baby Boomers (1943-1960) and Generation X (1961-1981). Individuals of each category are expected to be determined by the generational depending characteristics. Also, the authors measure this diversity according to the Blau's index for heterogeneity. Using the Asset4ESG rating, the results show that generational diversity can increase the integration of ESG aspects in the corporate management system.

From the stakeholder perspective, Hafsi and Turgut (2012) argue that diversity is even desired by customers and other broad stakeholders, because a diverse management might have greater sensitivity to stakeholders' interests. Also Harjoto et al. (2015) base their research study on the stakeholder theory according to which, the corporate management is required to satisfy stakeholders' needs. By this, the authors focus on diverse boards' decision-making concerning the engagement in CSR activities. In this context, the variable board diversity is measured by constructing the following seven diversity indices: gender, race, age, tenure, outside directorship, power and expertise

using Blau's index of heterogeneity. The sample comprises 1,489 U.S. firms over a time period of 12 years from 1999 – 2011. The results using the MSCI KLD CSR Rating in six areas: community, employee, environment, product, human rights and corporate governance, provides evidence for the stakeholder theory by finding positive correlations between board diversity and a greater number of CSR strength and negative correlations between board diversity and a fewer number of CSR concerns. Hence, the authors conclude that diverse boards pay higher attention to and provide greater monitoring of CSR performance. Consequently, board diversity increases the strengths and reduces the concerns. Especially, the diversity elements gender, tenure and expertise exercise the greatest influence on sustainability activities of corporations. The results also showed that greater board diversity has a positive effect in particular on the CSR components community, environment, product and corporate governance. Concerning the individual diversity elements, the analysis found further evidence, that especially the diversity elements tenure and expertise have a minimizing effect on CSR concerns. Based on a sample of 126 U.S. companies over a period of 5 years, Boulouta (2013) also examines the impact of board gender diversity on corporate social performance approximated by the KLD sustainability rating. The results indicate that diversity on board level has a significant negative impact on the 'concerns', i.e. the higher the gender diversity the lower the negative social practices of a company. Furthermore, Harjoto et al. (2015) suggest, that the CSR-strengths increasing and CSR-concerns decreasing effects of board diversity are especially greater for companies in more competitive markets and for companies that are active in the consumer goods oriented industry.

In a most recent study for the U.S., Landry et al. (2016) find evidence that the higher the number of female board directors the more likely a company is listed in corporate recognition lists such as 'the Most Admired Companies', 'the Most Ethical Companies' or 'the Best Company to Work for' and the 'Best Corporate Citizen'. Furthermore, the results imply that companies appearing on those lists have on average higher percentage of female directors compared to companies that are not presented in any of these rankings over the period of seven years covered by the study. Prior single-year studies by Bernardi et al. (2006, 2009) and Larkin et al. (2012) also state that for Fortune500 companies, a higher number of female board members is correlated with the company being listed on corporate recognition lists. Also, the authors Hafsi and Turgut (2013) find a positive correlation between demographic diversity in boards, in

particular the age and gender of directors and corporate social performance. However, this effect is moderated by the structural diversity of boards which comprises processes and other board characteristics such as board size, board independence etc. except board member demographics. Also, Bear et al. (2010) show evidence for improvements in CSR with increasing board gender diversity.

For Korea, Chang et al. (2015) undertake a research study to analyze the impact of board characteristics on firm sustainability performance. They assume that for Korea these effects should be differently patterned, in particular non-linear compared to most of the results of western countries-oriented studies. The authors find evidence for a curvilinear pattern between companies' CSR performance and board members' educational diversity, board independence and CEO-outside director social ties concluding, that the institutional settings play an important role for the linkage between CSR and board characteristics. For Europe one of the most important studies is undertaken by Isidro and Sobral (2015) who analyzed the direct impacts of gender diversity on firm value and the indirect impacts via compliance with ethical and social compliance. By using a simultaneous equation model, the results show no correlation between greater female representation on board of directors and financial performance. However, for the indirect effects, the authors find proof, that board gender diversity has a positive increasing effect on the social and ethical compliance that in turn is associated with higher corporate financial performance.

Empirical research on impacts of board gender diversity and in particular, subordinated management diversity on environmental sustainability is near non-existent. Especially, for the real estate industry, in fact research has proved a strong link between environmental sustainability in the sense of low emission, energy and resource efficiency and the higher property valuation (e.g. Fuerst and McAllister, 2011; Chegut et al., 2012; Fuerst et al., 2013), however, concerning the effects of gender diversity on the real estate and construction industry, there is no research to our best knowledge. Hence, this work closes the research gap and provides initial research in this field.

3.3 Research hypotheses

Sustainability and in particular, environmental sustainability is becoming more and more important for the society as a whole. The foremost reason for increased public, private as well as regulatory attention is the threatening climate change. As a result,

corporations are increasingly forced to take responsibility for their actions. Grossly negligent ignorance of such responsibilities can result in severe image damages. Furthermore, from the companies' competitiveness point of view, considering sustainable development in the core business can have direct and indirect financial performance benefits such as energy efficiency, increasing customer loyalty and trust, natural resource independence and prevention of lawsuits and penalty payments triggered by environmental scandals. Companies are trying to improve their sustainability performance. Gender diversity is identified as a mean to reach this objective. However, as explained in the previous section, gender diversity is assumed to be a desirable objective from an economic as well as an ethical point of view. However, academic research mainly analyzes the financial performance implications of gender parity on board of directors' level. In this context, quotas improving gender parity are criticized as tokenism. Firstly, the predominant part of the business world still has one female board member. Furthermore, important decision-making positions are all male dominated. Hence, there is a double tokenism effect:

1) The tokenism of having one woman on the board.
2) The tokenism of having gender parity on board level but no female managers in important decision-making positions.

Taking this into account the aforementioned assumed positive effects of gender diversity in management and the lacking literature on this subject concerning sustainability, the aim of this research study is to explore and better understand the link between gender diverse management and corporate environmental performance. Hence the main research hypotheses addressed in this study are the following:

H1.1: Female managers in decision-relevant positions have a positive influence on the overall *environmental sustainability performance of a company.*

H1.2: Female managers in decision-relevant positions have a positive influence on the environmental resource reduction/product innovation/emission reduction.

H1.3: The positive environmental impact of female managers is higher for companies with at least 10 % female managers.

H1.4: Board diversity has a smaller impact on corporate environmental performance.

H2.1: Female managers in decision-relevant positions have a higher positive influence on the overall *environmental sustainability performance of a real estate company.*

H2.2: Female managers in decision-relevant positions have a higher positive influence on the environmental resource reduction/product innovation/emission reduction of real estate companies.

In this context it is also analyzed what aspects of environmental sustainability (resource reduction, product innovation or emission reduction) are highly influenced by female managers. Furthermore, this paper aims to find out whether board level diversity has also an effect on environmental performance by using the board level diversity score produced by Thomson Reuters Asset4ESG index and if so, whether board diversity has a lower positive impact on environmental sustainability compared to female managers. The focus will also be on the effect of board level diversity on the environmental sustainability sub-scores. Particularly, for the majorly male-dominated real estate and construction industry it is examined, whether there are any benefits from female management. Moreover, the real estate industry is also analyzed with respect to the diversity impacts on the different environmental sustainability sub-scores.

3.4 Research design

3.4.1 Sample selection

The sample of companies analyzed in this study comprise Thomson Reuters' group of companies whose sustainability performance is rated in the Asset4ESG database. The initial sample covers a broad, global range of 3,799 companies from different industrial sectors, geographical regions and companies with different corporate characteristics such as company size. After the elimination of obsolete data and companies not operating anymore, a final unbalanced panel data set of 3,403 companies remains over a time span of 14 years (2002-2015). For these companies the data on the corporate environmental sustainability performance, the board diversity score, the percentage of female managers as well as the data on corporate employee diversity is adapted from Thomson Reuters Asset4ESG database. Thomson Reuters publishes since 2001 annually information on corporate sustainability based on more than 400 individual data points on financial, environmental, social and governance performance of companies. These individual data points are the basis for the calculation of more than 70 key performance

indicators that in turn are summed up to category scores for each of the three sustainability pillars: environmental, social and governance. In the case of environmental sustainability, the KPI's sum up to the categories "Product Innovation", "Emission Reduction" and "Resource Reduction" that are also subject of the current study. The data is collected manually from all publicly available information sources and is controlled and verified in a comprehensive process by analysts. Hence, this data set is the most comprehensive data to be available on sustainability and is increasingly applied in research that was until now dominated by MSCI KLD sustainability rating restricted to the U.S. The remaining data for the control variables such as the financial performance measures are retrieved from Datastream.

3.4.2 Measures and descriptive statistics

As already discussed, the dependent variable is primarily the environmental pillar score (Envscore) derived from the Asset4ESG data set. According to Thomson Reuters, this environmental sustainability score measures a company's impact on the ecosystems and all living and non-living resources such as water, air and land. In fact, the score represents a company's ability to make the best use of its management practice to prevent environmental hazards and risks as well as the best use of its environmental opportunities to generate long-term shareholder value. The variable has only positive values and the score varies between 0 (lowest) and 100 (highest), also interpretable as percentage numbers. Since this overall condensed environmental sustainability score might provide only a one-dimensional view of the environmental sustainability performance of a company, the three sub-category scores "Product Innovation" (ENPI), "Emission Reduction" (ENER) and "Resource Reduction" (ENRR) are further dependent variables that are used to make an in depth analysis of the specific environmental performance. ENPI, in particular, measures the company's efforts to support research and development of eco-friendly and -efficient products and/or services. The creation of new technologies and processes or the increased durability of products and materials can open new market opportunities and by this reduce environmental costs and burdens for the company's customers. ENRR captures the company's effectiveness and the commitment of its management to increase the effectiveness of natural resource consumption. That is for example, the reduction of natural resources (e.g. water, energy, wood etc.) in the production process or the creation of more eco-efficient solutions by

improving supply chain management. ENER measures a company's ability to reduce hazardous environmental emissions such as greenhouse gases, hazardous waste or negative impacts on the biodiversity in the corporate production and operational processes. Further, it comprises the company's co-operation with environmental organizations to reduce its environmental footprint in the local as well as broader community. All three variables have positive values and the scores range between 0 and 100, also interpretable as percentage numbers. In order to control for any serial correlations among the dependent variables, in the sense of dynamic panel data, the first lag is used as independent variable - a common approach in research (Isidro and Sobral, 2015; Harjoto et al., 2015). As independent variable the percentage of female managers is used. This variable is a data point and hence not subject to any aggregations. As a robustness check the employee diversity is used as a proxy for management diversity. The reason for this is that if a company is diversified in management the employment diversity might be obvious. The percentage of female employees is also a data point variable and not aggregated. The control variables are chosen according to the most commonly used control variables in the empirical research literature concerning the determinants of corporate sustainability performance. In this context, the majority of research focuses on company size, industry, risk and financial performance measures (Margolis and Walsh, 2001; Carter et al., 2003; Adams and Ferreira, 2009; Boulouta, 2013; Harjoto et al., 2015). Various corporate financial performance measures are taken into consideration to account for different aspects of performance. Market performance is calculated as an approximation of Tobin's Q by taking the sum of the market value of equity and the book value of debt, divided by the book value of total assets. In order to account for the companies' accounting performance, return on assets (ROA) is included into the equation. While the natural logarithm of total assets is expected to control for the size of the company, the risk is approximated by the variable leverage that in turn is calculated by the long-term debt to total assets ratio (Miller and Bromiley, 1990; Waddock and Graves, 1997; Boulouta, 2013; Orlitzky and Benjamin, 2013; Harjoto et al., 2015). As a proxy for the operational performance the net sales growth within a year is calculated. The level of company diversification is approximated by capital expenditures (capex) following Harjato et al. (2015). As already discussed in detail, the majority of literature in this field focuses on the effects of board diversity on corporate sustainability. In order to isolate the effects of female managers on sustainability, a board diversity score is added as a control variable. This Asset4ESG category score

assesses a company's management commitment and effectiveness towards the implementation of governance best practice concerning board diversity. Consequently, the higher the category score, the higher the company's ability to ensure critical exchange of ideas and independent decision-making process by establishing an experienced, diverse and independent board. This variable is expected to control for all diversity matters on board level in order to prevent bias resulting out of the omitted influence of a diverse board. Further measures controlled for are the ratio of earnings before interest and tax (ebit) to sales as a measure for company's profitability and the dividend yield.

The descriptive statistics for the common sample are illustrated in the subsequent exhibit 3.2 followed by the descriptive statistics of various sub-samples in exhibit 3.3.

Exhibit 3.2| Descriptive statistics of the total sample

	Observations	Mean	Maximum	Minimum	Std. Dev.
Envscore	20,180	48.77	97.30	0.00	32.55
ENER	20,180	48.50	98.04	0.00	32.50
ENPI	20,180	48.18	99.68	0.00	31.34
ENRR	20,180	48.73	97.21	0.00	32.73
%Female Managers	20,180	7.76	85.12	0.00	14.33
Empl. Diversity	20,180	14.31	98.00	0.00	20.56
Board Diversity	20,180	51.47	99.00	1.31	31.36
Total Assets	20,180	33,513,267	3,014,500,227	11,479.62	148,764,412
Sales Growth	20,180	0.11	1.67	-0.83	0.24
ROA	20,180	0.05	0.97	-0.97	0.10
Leverage	20,180	0.19	2.67	0.00	0.17
Capex	20,180	599,186.61	38,378,803.84	49.38	1,740,227.00
EBIT Sales Ratio	20,180	0.15	0.93	-0.52	0.17
Tobin's Q	20,180	0.24	2.68	0.00	0.19
Dividend Yield	20,180	2.32	61.02	0.00	2.52

Source: Own illustration.

The sample statistics show that on average, the sample companies have an environmental sustainability (Envscore) score of 48.77 %. Also, the average scores for ENER, ENPI and ENRR are in the same range. Considering the possible score range is 0 to 100, the mean indicates a moderate average scoring. The minimum of 0 % and the maximum of almost 100 % with a standard deviation of about 32 % indicate quite large variation between the companies that in turn is a good prerequisite for the following regression analysis. The average company in the sample has total assets of 33,513,267 Euro, whereby the largest company has total assets of 3,014,500,227 Euro. In this

context, it is important to consider, that the total sample also includes financial companies whose financial accounting display certain differences compared to other sectors. The minimum total asset size of about 11,480 Euro and the standard deviation of 148,764,412 Euro show a wide distribution between different company sizes. The average company in the sample has 7.76 % female managers and a total of 14.31 % female employees. The numbers indicate enough variations with a maximum of 85.12 % female managers and a maximum of 98 % female employees. Both variables have a minimum of 0 % and a standard deviation of 14.33 % and 20.56 %, respectively. Also the board gender diversity score varies between the minimum of 1.31 % and the maximum of 99 % with a mean of 51.47 %.

The descriptive statistics of the sub-samples (real estate, industry, utilities, financial and insurance) are showed in the following exhibit 3.3.

Exhibit 3.3| Descriptive statistics of sub-samples

Exhibit 3.3.1: Real estate sub-sample					
	Observations	**Mean**	**Maximum**	**Minimum**	**Std. Dev.**
Envscore	1,843	42.09	97.18	8.61	30.79
ENER	1,843	38.83	97.68	7.42	30.49
ENPI	1,843	47.57	99.68	12.62	30.35
ENRR	1,843	41.21	96.22	7.53	31.32
%Female Managers	1,843	6.48	73.00	0.00	13.70
Empl. Diversity	1,843	13.06	84.00	0.00	20.21
Board Diversity	1,843	52.67	94.46	1.31	31.54
Total Assets	1,843	8,526,198	196,484,780	91,781	14,152,605
Sales Growth	1,843	0.23	190.88	-3.51	4.51
ROA	1,843	0.03	0.53	-0.85	0.07
Leverage	1,843	0.29	1.04	0.00	0.19
Capex	1,843	260,648.42	18,276,215.00	0.00	576,118.84
EBIT Sales Ratio	1,843	0.39	14.50	-6.47	0.82
Tobin's Q	1,843	0.36	1.05	0.00	0.20
Dividend Yield	1,843	3.38	41.54	0.00	3.43

Exhibit 3.3.2: Industry sub-sample					
	Observations	**Mean**	**Maximum**	**Minimum**	**Std. Dev.**
Envscore	6,988	54.19	97.21	0.00	31.65
ENER	6,988	54.56	98.04	0.00	31.49
ENPI	6,988	53.24	99.68	0.00	32.21
ENRR	6,988	52.37	97.01	0.00	31.41
%Female Managers	6,988	5.18	85.12	0.00	9.65
Empl. Diversity	6,988	9.84	85.12	0.00	13.46
Board Diversity	6,988	51.08	95.82	1.31	31.17
Total Assets	6,988	11,206,870	581,081,166	11,480	29,139,873
Sales Growth	6,988	0.48	1,079.30	-1.00	14.44
ROA	6,988	0.04	2.27	-4.72	0.14
Leverage	6,988	0.18	1.49	0.00	0.14
Capex	6,988	731,627.52	38,378,803.84	0.00	2,327,363.42
EBIT Sales Ratio	6,988	-1.29	173.34	-2,523.25	38.83
Tobin's Q	6,988	0.24	1.96	0.00	0.16
Dividend Yield	6,988	2.07	43.96	0.00	2.32

Exhibit 3.3.3: Utilities sub-sample					
	Observations	**Mean**	**Maximum**	**Minimum**	**Std. Dev.**
Envscore	6,952	48.15	97.3	0.00	32.33
ENER	6,952	48.83	97.81	7.29	32.67
ENPI	6,952	45.19	99.68	9.05	30.30
ENRR	6,952	49.53	97.21	7.44	32.84
%Female Managers	6,952	9.42	83.00	0.00	16.50
Empl. Diversity	6,952	16.28	98.00	0.00	22.81
Board Diversity	6,952	51.06	99.00	1.59	31.62
Total Assets	6,952	10,612,667	354,123,778	18,031	23,114,125
Sales Growth	6,952	0.77	3,701.47	-2.27	44.92
ROA	6,952	0.06	3.36	-2.08	0.12
Leverage	6,952	0.20	2.67	0.00	0.19
Capex	6,952	520,574.56	30,761,000.00	0.00	1,402,701.79
EBIT Sales Ratio	6,952	-0.49	6.64	-2,156.83	29.29
Tobin's Q	6,952	0.26	2.68	0.00	0.20
Dividend Yield	6,952	2.20	61.02	0.00	2.39

Exhibit 3.3.4: Financial and insurance sub-sample					
	Observations	**Mean**	**Maximum**	**Minimum**	**Std. Dev.**
Envscore	2,991	40.36	96.97	8.30	32.52
ENER	2,991	39.50	97.58	7.25	31.55
ENPI	2,991	41.72	99.67	13.66	29.66
ENRR	2,991	41.01	97.18	7.33	33.69
%Female Managers	2,991	11.08	79.87	0.00	17.70
Empl. Diversity	2,991	21.20	92.00	0.00	26.45
Board Diversity	2,991	51.51	96.26	1.94	30.51
Total Assets	2,991	163,405,920	3,014,500,227	21,014	354,607,848
Sales Growth	2,991	23.97	61,691.00	-2.23	1,134.80
ROA	2,991	0.02	1.15	-0.49	0.06
Leverage	2,991	0.10	0.94	0.00	0.13
Capex	2,991	330,259.59	18,453,795.00	0.00	1,070,639.62
EBIT Sales Ratio	2,991	-5.87	472.00	-16,628.61	306.96
Tobin's Q	2,991	0.17	0.95	0.00	0.17
Dividend Yield	2,991	2.67	57.94	0.00	2.41

Source: Own illustration.

The comparison of different sub-samples provides interesting insights into the data set: The financial and insurance companies have the least environmental sustainability scores (Envscore: 40.36 %; ENER: 39.5 %; ENPI: 41.72 %; ENRR: 41.01 %) which do not really surprise due to their service-oriented, non-producing business sector. The real estate and construction industry's sustainability performance is on average very close to that of financial and insurance companies. However, taking into account, that this sector has the highest exposure due to its business activities as one of the main contributors to climate change and resource exploitation (see previous chapter), the results indicate that the real estate and construction industry needs environmental sustainability improvements. Furthermore, apart from industry companies, real estate and construction companies have the lowest number of female managers: As such, an average company of the sector has 6.48 % female managers, while the average company of the financial and insurance sector employs 11.08 % female managers, marking the highest number. Also, the employment diversity is by far the highest in the finance and insurance sector (22.2%), while real estate and construction industry has on average 13.06 % female employees – the second lowest numbers after the industry sub-sample with a corporate gender diversity of 9.84 %. These numbers confirm first of all that the variable corporate gender diversity can be an approximation for the management diversity, since the values of the variables female managers and employment diversity follow the same pattern.

All sub-samples have a minimum number of female managers of zero. This indicates that gender diversity on management level is still an issue across all sub-samples. It is also noticeable, that the average board diversity score of all sub-samples is in the range of 51.06 % (utilities) to 52.67 % (real estate). This indicates a high discrepancy to the low number of female managers supporting the fundamental assumption of this work that board level diversity aspirations might be subject to tokenism if the diversity is not promoted on decision-making management levels. Furthermore, the narrow distribution of the average board diversity scores also suggest that meanwhile the legislative activities concerning board gender diversity have reached the companies in all sectors, resulting in greater attempts to set the framework conditions for diversity on board level.

However, the large variations in the sustainability scores and the number of female managers across different industries suggest the need to control for industrial effects. Hence, the reported results in the following regression analysis are based on industry fixed effects.

The pairwise correlation coefficients indicate high correlations for the environmental sustainability performance with the subcategories ENER, ENPI and ENRR. This is not surprising, since these three categories sum up to Envscore. The correlations of interest are the coefficients of board diversity, percentage of female managers and employment diversity with Envscore. As expected, the percentage of female managers and employment diversity exhibit positive values around 0.41 and 0.45 – which are within the scope of acceptable correlations (Evans, 1996). Also, the correlations of female managers with environmental sustainability subcategories are in the same range and thus acceptable. Female managers and employment diversity have a quite high correlation of about 0.76, however, these variables are not used in the same equation. The same applies for Envscore and ENER, ENPI and ENRR. Board diversity and the percentage of female managers have correlation of about 0.05 which indicates that the common interface of these two variables is quite low and hence potential bias from multicollinearity can be excluded. As suggested by empirical literature, though weak, there are positive correlations between board diversity and environmental (sub-)scores. The following exhibit 3.4 summarizes the correlation coefficients.

Exhibit 3.4| Key variables pairwise correlation coefficients

	Envscore	ENER	ENPI	ENRR	Board Diversity	Empl. Diversity	%Female Managers
Envscore	1						
ENER	0.9326	1					
ENPI	0.8362	0.6600	1				
ENRR	0.9336	0.8642	0.6563	1			
Board Diversity	0.0970	0.0943	0.1201	0.0557	1		
Empl_ Diversity	0.4489	0.4440	0.2733	0.4906	0.0007	1	
%Female Managers	0.4074	0.4115	0.2474	0.4429	0.0536	0.7590	1

Source: Own illustration.

3.5 Empirical results

The empirical analysis examines the impact of the percentage of female managers in a company on the environmental performance using multivariate regression analysis and controlling for external factors that other empirical studies have identified as determinants of Corporate Social Responsibility (Harjoto and Jo, 2011; Baron et al., 2011; Harjoto et al., 2015).

For the panel regression, in a first step, it was determined whether a fixed effects or random effects model would be more appropriate. For this, the crucial assumption is that the random effects are not correlated with the explanatory variables. The Hausman test resulted in a p-value of 0.000 meaning that the hypothesis of correlated random effects and thus the random effects model can be abandoned (results are not tabulated here). As expected, the firm-fixed effects model is the more suitable model controlling for time-invariant firm and country characteristics. Since multicollinearity is a quite large problem in panel data regression, the Durbin Watson test is performed and the results of less than 1 show serial correlation in the residuals. To overcome this problem, the first lag of the dependent variable is implemented according to a dynamic panel data model in the equation. In order to control for heteroscedasticity, the white cross section coefficient covariance method is chosen. The results of the panel regression analysis are summarized in the following exhibit 3.5.

Exhibit 3.5| Regression results for Envscore, ENER, ENPI and ENRR as dependent variables

	Envscore	ENER	ENPI	ENRR
% Female Managers	0.0645** (2.2443)	0.0680** (1.9743)	0.1782*** (4.4746)	0.0170 (0.4722)
Board Diversity	0.0538*** (7.3432)	0.0544*** (6.6945)	0.0483*** (5.3363)	0.0572*** (6.8212)

Total Assets	5.0830*** (15.7185)	5.0684*** (14.2070)	4.0007*** (9.8705)	5.9289*** (16.0180)
Sales Growth	0.0010*** (3.4149)	0.0011*** (2.6763)	0.0019*** (5.4751)	0.0010*** (3.5866)
ROA	-1.8081** (2.5070)	-0.9577 (1.2558)	-2.4113*** (2.6943)	-1.9011** (2.2621)
Leverage	0.7460 (0.4924)	0.6524 (0.3808)	2.3020 (1.1978)	0.4827 (0.2687)
Capex	-0.1689 (1.1670)	-0.4343*** (0.0084)	0.1890 (1.0596)	-0.2129 (1.2683)
Ebit Sales Ratio	-0.0007 (0.3105)	-0.0010 (0.5140)	-0.0021 (1.2860)	0.0010 (3.5866)***
Lag Envscore	0.5072*** (46.5004)			
Lag ENER Score		0.4630*** (42.4900)		
Lag ENPI Score			0.4425*** (41.0090)	
Lag ENRR Score				0.4644*** (43.4798)
Tobin's Q	0.8309 (0.5927)	1.0173 (0.6573)	-2.4145 (1.3503)	1.2806 (0.7525)
Dividend Yield	0.0078 (0.1994)	0.0197 (0.3739)	0.0205 (0.4064)	0.0139 (0.3101)
Constant	-61.8955*** (12.4222)	-56.2228*** (10.1699)	-46.1552*** (7.2596)	-73.4277*** (12.8282)
R^2-adjusted	0.9028	0.8824	0.8289	0.8695
Durbin Watson Stat	2.2635	2.2168	2.2554	2.2763
No. of cross sections	3528	3528	3528	3528
No. Observations	20808	20808	20808	20808
Full sample	Yes	Yes	Yes	Yes

Significance of coefficients: *p<0.10; **p<0.05; ***p<0.01; t-values in parenthesis.
Source: Own illustration.

The results show a positive, though weak, influence of female managers on the environmental sustainability performance of the company. That is a 10 % increase in female manager results in a 0.6450 % higher total environmental sustainability score at a 5 % significance level, ceteris paribus. As suggested by previous literature, the results prove the positive impact of diverse boards on the environmental sustainability performance of a company. These results also confirm the assumption that the management level gender diversity has a larger influence on the sustainability performance of a company compared to the board level diversity. The influence of the company size on the environmental performance is of about the same magnitude: A 10 % increase in total assets results in a 0.5083 % increase in environmental performance score at a 1 % significance level, ceteris paribus. One possible explanation for the positive effects could be that large corporations have the necessary funds to invest in environmental sustainability. The largest impact is exercised by return on assets (ROA). A one unit increase in ROA results in a 1.8081 % decrease of the environmental

sustainability score, ceteris paribus. The coefficient is significant at the 5 % level. A plausible explanation could be that the higher the ROA, the higher the corporate effectiveness in generating net income from the monetary resources it has for investment purpose. However, sustainable environmental earnings are mostly contradictory to high profits in the short term. Hence, increasing the effectiveness of investment abilities – that is the return on assets on an annual basis – is at the cost of environmental sustainability in the short term. Concerning CAPEX as a measure of corporate diversity, the negative impact could indicate that the operational expansion of a company, the investment in new projects to increase the scope of the company's operations is in the first place also requiring resources that cannot be invested in environmental sustainability. Hence, the more diverse a company is set up, the fewer resources are available to focus on the highest and best environmental standards in every field. Leverage as a measure of risk can have a positive impact on the corporate environmental sustainability. Since, with increasing risk corporations might try to compensate with risk reducing factors such as sustainability (Lee and Faff, 2009; Mishra and Modi, 2013). Though in this case, the coefficient is not significant at the common significant levels.

The impact on the environmental sustainability sub-categories is of a similar magnitude for the emission reduction category – the ENER score. It is weaker for the environmental resource reduction category (ENRR) and stronger for the environmental product innovation (ENPI) sub-category compared to the Envscore. For ENPI, a 10 % increase in female manager results in a 1.782 % increase in environmental product innovation sustainability score, holding other effects fixed. Thus, it can be assumed that female managers predominantly promote the development of eco-efficient products and services and thereby increase the sustainable product innovation abilities of a company. The goodness of fit of the regression models is very good with range above 0.80.

3.5.1 Empirical results for companies with at least 10 percent female managers

When extracting the sample of companies with at least 10 % female managers, the regression results of the fixed effect panel model show the following pattern, as presented in exhibit 3.6:

Exhibit 3.6| Regression results of the Envscore, ENER, ENPI and ENRR for the sub-sample of at least 10 % female managers

	Envscore	ENER	ENPI	ENRR
% Female Managers	0.1660*** (6.8065)	0.1698*** (5.7584)	0.2619*** (6.7341)	0.1210*** (4.1529)
Board Diversity	0.0356*** (3.8004)	0.0387*** (3.4174)	0.0328** (2.1942)	0.0376*** (3.3573)
Total Assets	2.5980*** (4.7041)	2.5504*** (3.8215)	3.0781*** (3.5219)	3.5198*** (5.3433)
Sales Growth	0.0035 (0.1356)	0.0033 (0.1078)	0.0006 (0.0143)	-0.0001 (0.0037)
ROA	1.4422 (0.7257)	1.0310 (0.4293)	-0.8452 (0.2664)	0.9410 (0.3959)
Leverage	0.7828 (0.2198)	-1.4738 (0.3424)	3.5186 (0.6186)	2.2020 (0.5170)
Capex	-0.6886*** (2.6662)	-0.9771*** (3.1311)	0.0041 (0.0099)	-0.6794 (2.2011)
Ebit Sales Ratio	-0.0021 (0.1548)	-0.0009 (0.0542)	-0.0024 (0.1100)	-0.0021 (0.1243)
Lag Envscore	0.3325*** (31.3625)			
Lag ENER Score		0.3063*** (26.5832)		
Lag ENPI Score			0.3171*** (26.6558)	
Lag ENRR Score				0.2635*** (23.1620)
Tobin's Q	-5.9241* (1.6771)	-4.1447 (0.9708)	-9.0023 (1.596)	-8.3566** (1.9785)
Dividend Yield	0.1097 (1.5077)	0.1141 (1.2978)	0.1637 (1.4096)	0.0714 (0.8213)
Constant	12.6428 (1.5829)	18.7608* (1.9415)	-11.2578 (0.8844)	4.6163 (0.4834)
R^2-adjusted	0.8827	0.8311	0.8139	0.8154
Durbin Watson Stat	2.1602	2.1565	2.2916	2.184
No. of cross sections	1379	1379	1379	1379
No. Observations	6001	6001	6001	6001
Full sample	No	No	No	No

Significance of coefficients: *p<0.10; **p<0.05; ***p<0.01; t-values in parenthesis.
Source: Own illustration.

The results show even higher sustainability impacts of female managers. As such, a 10 % increase in the number of female manager results in a 1.66 % increase in the Envscore. Also, the highest impact can be identified for the ENPI score. A 10 % increase in the number of female managers results in a 2.62 % increase in a company's environmental product innovation abilities. Hence, companies can generate even 1.5 times higher positive impacts of diversity when they employ at least 10 % female managers.

3.5.2 Real estate industry specific results

In order to analyze the impact of gender diversity in management positions on the real estate and construction industry's environmental sustainability performance, the sample is reduced to the real estate and construction industry resulting in 301 companies and 1.833 observations. The results of the fixed effects panel regression with white cross section coefficient covariance method are displayed in the following exhibit 3.7.

Exhibit 3.7| Regression results of the Envscore, ENER, ENPI and ENRR for the real estate and construction sub-sample

	Envscore	**ENER**	**ENPI**	**ENRR**
%Female Managers	0.1442* (1.7902)	0.1638** (2.0064)	0.1480 (1.2960)	0.0930 (0.9806)
Board Diversity	0.0764*** (5.1680)	0.0725*** (2.9986)	0.0563** (2.3173)	0.0659*** (4.3005)
Total Assets	5.8076*** (5.7488)	6.1295*** (6.2289)	4.3997*** (4.4951)	6.7048*** (6.2503)
Sales Growth	-0.0848 (0.2398)	-0.1990 (0.4649)	-0.0298 (0.0909)	-0.5402 (1.3908)
ROA	-14.2909** (2.2340)	-16.0976*** (3.4570)	-14.1310* (1.7584)	-6.2219 (1.0417)
Leverage	2.5345 (0.4460)	-11.2237 (1.5152)	13.0454* (1.7892)	-3.1769 (0.3171)
Capex	$-19.2x10^9$ (0.4624)	-1.0757*** (3.4075)	$-11.9x10^9$*** (4.3607)	$-83.8x10^9$* (1.7939)
Ebit Sales Ratio	0.3474 (0.5328)	0.8808* (1.9069)	-0.4491 (0.3180)	-0.3045 (0.5440)
Lag Envscore	0.5126*** (8.8840)			
Lag ENER Score		0.4331*** (20.3470)		
Lag ENPI Score			0.4594** (7.9426)	
Lag ENRR Score				0.4531*** (8.7723)
Tobin's Q	5.1492 (0.7206)	16.715** (2.2736)	-8.0031 (1.0412)	11.0637 (1.0647)
Dividend Yield	-0.1124** (2.0164)	-0.0961 (0.9114)	-0.1884** (2.0797)	-0.0214 (0.2665)
Constant	-75.8705 (5.4181)	-65.2522*** (4.6253)	-45.2612*** (3.4137)	-88.9749*** (5.2577)
R^2-adjusted	0.9008	0.8693	0.8110	0.8585
Durbin Watson Stat	2.1352	2.1317	2.2279	2.2783
No. of cross sections	301	318	301	301
No. Observations	1833	1882	1833	1833
Full sample	No	No	No	No

Significance of coefficients: *p<0.10; **p<0.05; ***p<0.01; t-values in parenthesis.
Source: Own illustration.

The regression results of the fixed effects panel analysis show that for the real estate and construction industry, female managers have an even greater positive impact compared to the total sample. A 10 % increase in female manager results in a 1.44 % increase in the overall environmental sustainability score. Also, the impact on the ENER sub-category is significantly higher, with a 10 % increase in female manager leading to a 1.64 % increase in emission reduction pillar score, ceteris paribus. This high impact of female managers on environmental emission reduction score provides proof that the real estate and construction industry could benefit the most – especially, in the field where the sector has the highest negative environmental impacts: the emission of CO_2 and other hazardous substances. Also, in the real estate industry, board diversity plays a significant role in determining the environmental sustainability performance.

3.6 Robustness tests

Several robustness tests are conducted to examine whether the initial results of the main regression analysis hold under different conditions. First of all, the proportion of female employees over a period of ten years is used as an approximation for the management diversity in order to test, whether the results hold using a different measure. The results are tabulated in exhibit 3.8.

Exhibit 3.8| Regression results with employee diversity as approximation for management diversity and impact on Envscore, ENER, ENPI and ENRR

	Envscore	ENER	ENPI	ENRR
% Female Employees	0.0549** (2.4530)	0.0150 (0.3137)	0.0962* (1.7718)	0.0414 (1.2848)
Board Diversity	0.0393*** (2.7584)	0.0351*** (4.8744)	0.0378*** (4.5944)	0.0432*** (3.8582)
Total Assets	3.8303*** (6.2834)	4.0180*** (12.2349)	4.0869*** (10.4223)	4.5377*** (7.2311)
Sales Growth	0.0064 (1.6090)	0.0011*** (3.2012)	0.0020*** (6.0851)	0.0010*** (4.6868)
ROA	-1.4339 (1.6392)	-0.3875 (0.5213)	-3.2932*** (3.1649)	-1.1073 (0.9644)
Leverage	-0.8854 (0.5060)	-1.6354 (0.9567)	2.2001 (1.1284)	-0.0229 (0.0200)
Capex	-0.2014 (1.0759)	-0.2366 (1.5794)	-0.0455 (0.2753)	-0.1859 (1.1499)
Ebit Sales Ratio	-0.0022** (2.0050)	-0.0031** (2.044)	-0.0003 (0.3953)	-0.0014 (0.7409)
Lag Envscore	0.4360*** (6.5088)			
Lag ENER Score		0.4077*** (39.1222)		
Lag ENPI Score			0.4041*** (39.1896)	

Lag ENRR Score				0.4256*** (8.7859)
Tobin's Q	1.2947 (0.8096)	1.5845 (0.9879)	-1.9267 (1.0059)	1.3734 (0.9491)
Dividend Yield	0.0145 (0.1937)	0.0119 (0.3106)	0.0403 (0.9258)	0.0166 (0.3068)
Constant		-35.9736 (6.9199)	-41.8945 (6.5294)	-47.3253 (4.4880)
R^2-adjusted	0.9228	0.8994	0.8431	0.8881
Durbin Watson Stat	2.2442	2.1422	2.2101	2.1865
Full sample	Yes	Yes	Yes	Yes
Time Period	2005-2015	2005-2015	2005-2016	2005-2017
No. of cross sections	3525	3525	3525	3525
No. Observations	19675	19675	19675	19675
Full sample	Yes	Yes	Yes	Yes

Significance of coefficients: *p<0.10; **p<0.05; ***p<0.01; t-values in parenthesis.
Source: Own illustration.

The results of the robustness check indicate a positive impact. The coefficients of the overall environmental sustainability score and the sub-category ENPI are significant at the 5 %, respectively 10 % significance level. However, the magnitude of the coefficients of ENER and ENRR is close to the main regression analysis, though the coefficients are not significant. A possible explanation for the lacking significance could be that in the presence of employment diversity, the effects formerly reflected by female management is now caught up by board gender diversity. Board diversity exerts a highly significant influence.

As a second step, a sensitivity analysis is undertaken by examining different sub-samples. Due to different accounting frameworks, the financial companies of the total sample could add some distorting effects in the initial regression analysis. In this context, the potential effects of the financial industry are canceled out by reducing the sample to non-financial companies (exhibit 3.9).

Exhibit 3.9| Regression results for the non-financial sub-sample

	Envscore	**ENER**	**ENPI**	**ENRR**
% Female Managers	0.0931*** (2.6727)	0.0930*** (3.4303)	0.1916*** (3.5057)	0.0573 (1.0376)
CGBS Score	0.0578*** (5.0666)	0.0501*** (4.5991)	0.0605*** (5.4520)	0.0615*** (4.9182)
Total Assets	5.2542*** (9.1713)	5.0793*** (9.9384)	4.0136*** (8.7397)	6.2737*** (9.2507)
Sales Growth	0.0015*** (4.3845)	0.0018*** (5.6785)	0.0025*** (5.3994)	0.0015*** (2.9537)
ROA	-1.5770* (1.7012)	-0.7576 (1.1142)	-2.2418* (1.7105)	-1.6920** (1.9726)
Leverage	1.0452 (0.6581)	0.5708 (0.2680)	2.4425 (1.5555)	0.9882 (0.6529)

Capex	-0.1463 (0.7851)	-0.2389 (1.3314)	0.1622 (0.6863)	-0.3272* (1.8061)
Ebit Sales Ratio	-0.0014 (0.5203)	-0.0020 (1.1210)	-0.0024 (-1.0194)	-0.0001 (0.0178)
Lag Envscore	0.5136*** (11.4949)			
Lag ENER Score		0.4764*** (13.8882)		
Lag ENPI Score			0.4470*** (8.4721)	
Lag ENRR Score				0.4634*** (10.2656)
Tobin's Q	0.5777 (0.4827)	0.9076 (0.6466)	-2.5110 (1.3344)	1.2555 (0.9000)
Dividend Yield	0.0843 (1.4219)	0.0953** (2.2392)	0.0814 (0.9508)	0.0783 (1.4023)
Constant	-63.3577*** (7.1367)	-56.8364*** (6.5674)	-45.0688*** (6.8154)	-75.5299*** (6.8041)
R^2-adjusted	0.8996	0.8792	0.8304	0.8632
Durbin Watson Stat	2.2906	2.2442	2.2694	2.2935
No. Of Cross sections	2824	2824	2824	2824
No. Observations	16,739	16,739	16,739	16,739
Full sample	No	No	No	No

Significance of coefficients: *p<0.10; **p<0.05; ***p<0.01; t-values in parenthesis.
Source: Own illustration.

The regression results of the fixed effects panel model as presented in exhibit 3.9 show that the initial results hold using the sub-sample of non-financial companies. Moreover, these sub-sample results are highly significant at the strictest significance level of 1 % and exert the highest influence - except for ENRR. As such, a 10 % increase in the number of female managers results in a 0.931 % increase in the total environmental sustainability score, holding all other factors constant. While the magnitude of the coefficients of ENER and ENRR are quite similar to the initial results, ENPI seems to have the strongest influence in the industrial sub-sample. A 10 % increase in female managers results in a 1.916 % increase in the sustainable product innovation sub-category. Hence, female managers are exerting influence on the long-term sustainability performance of the company by predominantly promoting the sustainable technical and innovative product development.

When it comes to sustainability, regional differences e.g. advanced vs. less developed countries or sustainability-specific legislation play an important role. Hence, despite a fixed effects model, as a next step, regional differences are cancelled out by analyzing a sub-sample of European countries. The results are presented in exhibit 3.10.

Exhibit 3.10| Regression results for the EU sub-sample

	Envscore	ENER	ENPI	ENRR
% Female Managers	0.1236*** (3.4219)	0.1262*** (3.4976)	0.2347*** (4.4867)	0.0877* (1.7876)
CGBS Score	0.0206*** (2.6060)	0.03111*** (2.7447)	0.0164 (0.8361)	0.0303** (2.5079)
Total Assets	4.8068*** (5.3594)	5.6450*** (5.9902)	5.2233*** (6.7997)	4.3229*** (3.9774)
Sales Growth	0.0009*** (6.2182)	0.0008*** (4.7490)	0.0018*** (11.1751)	0.0009*** (6.4915)
ROA	-3.6701 (1.5048)	-5.2211*** (2.7606)	0.9798 (0.3059)	-5.3169 (1.6425)
Leverage	0.7261 (0.1785)	-0.4564 (0.1025)	3.7678 (0.9360)	-1.6588 (0.4050)
Capex	-0.5927 (1.5276)	-1.0626** (2.1936)	-0.6141* (1.6526)	-0.2636 (0.6843)
Ebit Sales Ratio	0.0066 (0.5964)	0.0170* (1.6655)	-0.0233 (1.4945)	0.0240 (1.3036)
Lag Envscore	0.4451*** (9.9891)			
Lag ENER Score		0.4204*** (10.8254)		
Lag ENPI Score			0.400744*** (7.969975)	
Lag ENRR Score				0.3653*** (8.3772)
Tobin's Q	-4.8350 (1.6407)	-5.8478** (2.1083)	-6.5526 (1.6019)	-3.1955 (1.1918)
Dividend Yield	0.0383 (1.0241)	-0.0130 (0.4813)	0.0944 (1.2049)	0.0515 (1.3182)
Constant	-34.3473*** (3.5508)	-40.4231*** (3.9269)	-44.0791 (4.3927)	-24.8847* (1.8782)
R^2-adjusted	0.8889	0.8475	0.8087	0.8467
Durbin Watson Stat	2.1644	2.1587	2.2054	2.1327
No. of cross sections	842	842	842	842
No. Observations	5132	5132	5132	5132
Full sample	No	No	No	No

Significance of coefficients: *p<0.10; **p<0.05; ***p<0.01; t-values in parenthesis.
Source: Own illustration.

Also, the results of this analysis confirm the initial regression outcomes and indicate a even stronger impact of female managers on the environmental sustainability performance for developed countries (Europe). A 10 % increase in female employees on management level results in a 1.24 % increase in the overall environmental sustainability score and in a 1.26 % increase in the ENER sub-category score, holding other factors constant. Also here, the environmental product innovation sub-category seems to be highly influenced by female managers. A 10 % increase in female managers leads to a 2.38 % increase in the ENPI score, ceteris paribus.

3.7 Conclusion and discussion

Board gender diversity has been a heated debate in the public and corporate business world for a long time. Triggered by mainly two claims: Firstly, women on board of directors improve the effectiveness and hence the financial performance. Secondly, having female board members is the right thing to do from an equality-oriented perspective. The debate peaked in the increasing implementation of legislative regulations determining a gender quota on board level. Empirical research argued not only for women on boards due to positive financial performance implications but also concerning the increasingly importance gaining topic of sustainability, which diverse boards are expected to promote. In this context, environmental sustainability is one of the most important sustainability factors since non-sustainable and exploitive behavior affect people far beyond the corporate borders. Polluted air, resource scarcity or climate change not only affects the going-concern of corporations but also the livelihood of all human beings and animal life. The cost of misbehavior can severely damage the company's image and threat its existence when investors, public and legal entities turn away or make them accountable for their actions as it happened in the case of Volkswagen AG. Furthermore, increased environmental sustainability in terms of greater Corporate Social Responsibility leads to long-term competitiveness, customer loyalty and investor trust. Therefore, companies not only secure their long-term competitiveness but also gain and maintain public trust and support when investing in sustainability and acting in a sustainable way.

However, there is still no definitive empirical evidence for the positive effects of gender diversity on sustainability – especially, because the tokenism effect of gender quota is assumed to bias the results. Hence, this work extends the board gender debate to three new dimensions by focusing on the environmental sustainability as one of the most important sustainability dimensions, by putting emphasize on the real estate and construction industry as one of the main triggers of climate change and by analyzing the role of gender diverse management in order to circumvent the commonly known problem of tokenism. The basic assumption is that having a woman on the board is tokenism on the top management level. But having gender parity on board level and no women on subordinated management level will still preserve tokenism. This double tokenism effect will persist as long as gender parity becomes common in decision-

making management levels. Hence, this work's focus is innovative and to our best knowledge the first research to close the gap and provide initial results in this field.

The results of the empirical analysis provide evidence that gender diversity on management level has a positive impact on the environmental sustainability performance of a company. For the total sample the regression results show that a 10 % increase in female managers results in a 0.645 % higher environmental rating score, ceteris paribus. In particular, the foremost impact is exerted on the environmental product innovation score. In this context, a 10 % increase in female manager results in 1.782 % higher environmental product innovation score. That is, gender diversity on management level promotes a company's sustainability innovativeness and highly innovative companies in turn secure their long-term competitiveness and future-proofness. An isolated analysis of companies with at least 10 % female manager reveals an almost 1.5 times higher effect on the environmental product innovativeness compared to the total sample. Hence, increased effects can be generated with at least 10 % female managers.

Compared to the total sample, for the real estate and construction industry, management diversity exerts even stronger positive impacts on the environmental emission reduction score. The real estate industry as one of the main contributors of climate change would fulfill its sustainability responsibilities by increasing the number of women on decision-making level. Emission reduction in turn secures the long-term competitiveness and generates higher shareholder value. The results further confirm the positive impact of board gender diversity on the environmental sustainability performance of a company.

Hence, the results show that supporting gender diversity on management levels is not only the right thing to do from an ethical but also from an environmental and economic point of view. Analyzing the real estate industry as a sector with the highest impact on the environment and ecosystems, the results confirm that this industry too can fulfill its responsibility by supporting gender diversity on the management level. Thus, diversity works best for the company, if it is implemented on the board as well as on subordinated management levels. In fact, the sole implementation of gender quotas on board level rather drives "tokenism" instead of increasing management quality and hence misses the target. Consequently, the highest impact is initiated by management levels besides board of directors. Hence, the active management by women plays a more important role than the rather passive controlling and advising activities on board level which is

also assumed to be biased by tokenism. However, these positive effects also depend on the proper and serious implementation of CSR in the core business of the corporation. The ideal implementation of CSR goes far beyond altruism; it rather has indirect financial performance implications by providing the sustainable long-term success and competitiveness of the company. *'Greenwashing'* aspirations will fail to deliver the desired results. Therefore, the composition of senior management teams plays a crucial role in achieving effective group work.

3.8 References

Adams, R. B. and Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. Journal of Financial Economics 94(2), 291-309.

Azmat, G. (2014). Gender Diversity in teams. IZA World of Labor, 1-10.

Baron, D. P. (2009). Credence standards and social pressure. In A. Prakash & M. Potoski (eds.), Voluntary programs: A club theory perspective, (pp. 41-66). Cambridge.

Baron, D. P., Harjoto, M. and Jo, H. (2011). The economics and politics of corporate social performance. Business and Politics 13(2), 1-46.

Bauer, R., Koedijk, K. and Otten, R. (2005). International evidence on ethical mutual fund performance and investment style. Journal of Banking & Finance 29(7), 1751-1767.

Bear, S., Rahman, N. and Post, C. (2010). The impact of board diversity and gender composition on Corporate Social Responsibility and firm reputation. Journal of Business Ethics 97(2), 207-221.

Bernardi, R. A., Bosco, S. M. and Vassill, K. M. (2006). Does female representation of boards of directors associate with Fortune's '100 best companies to work for' list?. Business & Society 45(2), 235-280.

Bernardi, R. A., Bosco, S. M. and Coloumb, V. (2009). Does female representation of boards of directors associate with the 'most ethical companies' list?. Corporate Reputation Review 12(3), 270-280.

Brammer, S., Millington, A. and Pavelin, S. (2007). Gender and ethnic diversity among UK corporate boards. Corporate Governance: An international Review 15(2), 393-403.

Brancato, C. K. and Patterson, D. J. (1999). Board Diversity in the U.S. corporations: Best practices for broadening the profile of corporate boards. Research Report 1230-99-RR, The Conference Board.

Brundtland G. et al. (1987). Report of the World Commission on Environment and Development: Our Common Future. Brussels.

Boulouta, I. (2013). Hidden Connections: The Link between Board Gender Diversity and Corporate Social Performance. Journal of Business Ethics 113(2), 185-197.

Carter, D. A., Simkins, B. J. and Simpson, W. G. (2003). Corporate Governance, Board Diversity, and Firm Value. The Financial Review 38(1), 33-53.

Chang, Y. K., Oh, W.-Y., Park, Y. H. and Jang, M. G. (2015). Exploring the Relationship between Board Characteristics and CSR: Empirical Evidence from Korea. Journal of Business Ethics, 1-18.

Chegut, A., Eicholz, P. and Kok, N. (2012). Supply, demand and the value of green buildings. RICS.

Cheng, B., Ioannou, I., and Serafeim, G. (2014). Corporate Social Responsibility and access to finance. Strategic Management Journal 35(1), 1-23.

COM – Commission of the European Communities (2001). Green Paper: Promoting a European Framework for Corporate Social Responsibility. COM (2001) 366 final, Brussels.

COM – Commission of the European Communities (2011). A renewed EU Strategy 2011-14 for Corporate Social Responsibility. COM (2011) 0681 final, Brussels.

Cornell, B. and Shapiro, A. C. (1987). Corporate stakeholders and corporate finance. Financial Management, 5-14.

Credit Suisse Research Institute (2014). The CS Gender 3000: Women in Senior Management, Zurich.

Dhaliwal, D. S., Li, O. Z., Tsang, A., and Yang, Y. G. (2011). Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of Corporate Social Responsibility reporting. The Accounting Review 86(1), 59-100.

European Commission (2012). Women on Boards: Commission proposes 40 % objective. Press Release Brussels.

Eurosif (2014). European SRI Study 2014, p. 34. Brussels.

Evans, J. D. (1996). Straightforward statistics for the behavioural sciences. Pacific Grove, Ca. Brooks/Cole.

Ferrero-Ferero, I.,Fernández-Izquierdo, M. A. And Munoz-Torres, M. J. (2012). Can board diversity enhance the integration of ESG aspects in Management System?. Modeling and

Simulation in Engineering, Economics, and Management (pp. 1-9). Springer Berlin Heidelberg.

Fisman, R., Heal, G. and Nair, V. (2005). A model of corporate philantrophy. Working Paper, University of Colombia, New York.

Flammer, C. (2015). Does Corporate Social Responsibility lead to superior financial performance? A regression discontinuity approach. Management Science 61(11), 2549-2568.

Freeman, R. E. (1984). Strategic Management: A stakeholder approach. Cambridge University Press.

Freeman, R. E., Wicks, A. C. and Parmar, B. (2004). Stakeholder theory and "the corporate objective revisited". Organization Science 15(3), 364-369.

Fuerst, F. and McAllister, P. (2011). Eco-labeling in commercial office markets: Do LEED and Energy Star offices obtain multiple premiums?. Ecological Economics 70(6), 1220-1230.

Fuerst, F., Van de Wetering, J. and Wyatt, P. (2013). Is intrinsic energy efficiency reflected in the pricing of UK office lease?. Building Research & Information 41(4), 373-383.

Geczy, C., Stambaugh, R. F. and Levin, D. (2005). Investing in Socially Responsible Mutual Funds. Available at SSRN 416380.

Groysberg, B. and Bell, D. (2013). Dysfunction in the boardroom. Harvard Business Review 91(6), 89-97.

Global Sustainable Investment Alliance (GSIA) (2014). Global Sustainable Investment Review. Available at
http://www.gsi-alliance.org/wp-content/uploads/2015/02/GSIA_Review_download.pdf.

Hafsi, T. and Turgut, G. (2013). Boardroom Diversity and its Effect on Social Performance: Conceptualization and Empirical Evidence. Journal of Business Ethics 112(3), 463-479.

Harjoto, M. and Jo, H. (2011). Corporate Governance and CSR nexus. Journal of Business Ethics 100(1), 45-67.

Harjoto, M., Laksmana, I. and Lee, R. (2015). Board Diversity and Corporate Social Responsibility. Journal of Business Ethics 132(4), 641-660.

Higgs, D. (2003). Review of the role and effectiveness of non-executive directors. Stationery Office.
http://www.ecgi.org/codes/documents/higgsreport.pdf.

Isidro, H. and Sobral, M. (2015). The effects of women on corporate boards on firm value, financial performance, and ethical and social compliance. Journal of Business Ethics 132(1), 1-19.

Jensen, M. C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. Journal of Finance 48(3), 931-880.

Jensen, M. C. (2001). Value maximization, stakeholder theory, and the corporate objective function. Journal of Applied Corporate Finance 14(3), 8-21.

Jensen, M. C. (2002). Value maximization, stakeholder theory, and the corporate objective function. Business Ethics Quarterly, 12(2), 235-256.

Johnson, S. G., Schnatterly, K. and Hill, A. D. (2013). Board Composition Beyond Independence Social Capital, Human Capital, and Demographics. Journal of Management 39(1), 232-262.

Landry, E. E., Bernardi, R. A. and Bosco, S. M. (2016). Recognition for Sustained Corporate Social Responsibility: Female Directors Make a Difference. Corporate Social Responsibility and Environmental Management 23(1), 27-36.

Larkin, M. B., Bernardi, R. A. and Bosco, S. M. (2012). Corporate Reputation, board gender diversity and market performance. International Journal of Banking and Finance, 100(9), 1-26.

Leaton, J., Ranger, N., Ward, B., Sussams, L., and Brown, M. (2013). Unburnable Carbon 2013: Wasted capital and stranded assets. Carbon Tracker and Grantham Research Institute on Climate Change and the Environment, London School of Economics, London. http://www. carbontracker. org/wastedcapital.

Lee, M. D. P. (2008). A review of the theories of Corporate Social Responsibility: its evolutionary path and the road ahead. International Journal of Management Reviews 10(1), 305-328.

Lee, D. D., and Faff, R. W. (2009). Corporate sustainability performance and idiosyncratic risk: A global perspective. Financial Review 44(2), 213-237.

Lipton, M. and Lorsch, J. W. (1992). A modest proposal for improved corporate governance. The business lawyer 48, 59-77.

Luo, X. and Bhattacharya, C. B. (2006). Corporate Social Responsibility, customer satisfaction, and market value. Journal of marketing 70(4), 1-18.

Margolis, J. D. and Walsh, J. P. (2001). People and Profit: The Search for a link between a company's social and financial performance. Mahwah, NJ.

McKinsey & Company (2002). Global Investor Opinion Survey.

Melé, D., Debeljuh, P. and Arruda, M. C. (2006). Corporate ethical policies in large corporations in Argentina, Brazil and Spain. Journal of Business Ethics 63(1), 21-38.

Miller, K. D. and Bromiley, P. (1990). Strategic risk and corporate performance: An analysis of alternative risk measures. Academy of Management journal 33(4), 756-779.

Mishra, S. and Modi, S. B. (2013). Positive and negative Corporate Social Responsibility, financial leverage, and idiosyncratic risk. Journal of business ethics 117(2), 431-448.

OECD (2003). Environmentally Sustainable Buildings – Challenges and Policies. Paris. http://www.unep.org/sbci/pdfs/Paris-SustBuildings_OECD.pdf.

Oikonomou, I., Brooks, C. and Pavelin, S. (2012). The impact of corporate social performance on financial risk and utility: A longitudinal analysis. Financial Management 41(2), 483-515.

Orlitzky, M. and Benjamin, J. D. (2001). Corporate Social Performance and Firm Risk: A Meta-Analytic Review. Business & Society 40(4), 369-396.

Post, C. and Byron, K. (2015). Women on boards and firm financial performance: A meta-analysis. Academy of Management Journal 58(5), 1546-1571.

Robinson, G. and Dechant, K. (1997). Building a business case for diversity. The Academy of Management Executive 11(3), 21-31.

Schuwerk, S. and Weber, R. C (2015). Carbon Asset Risk: From Rhetoric to Action. Presented at the 1st Global Stranded Assets Conference, Oxford.

Skouloudis, A., Evangelinos, K. and Kourmousis, F. (2009). Development of an evaluation methodology for triple bottom line reports using international standards on reporting. Environmental Management 44(2), 298-311.

Turcsanyi, J. and Sisaye, S. (2013). Corporate Social Responsibility and its link to financial performance: Application to Johnson & Johnson, a pharmaceutical company. World Journal of Science, Technology and Sustainable Development 10(1), 4-18.

UNEP (2009). Sustainable Buildings & Climate Initiative, Buildings and Climate Change – Summary for Decision-Makers. United Nations Environmental Programme, Sustainable Buildings and Climate Initiative. Paris, 1-62.

Waddock, S. A. and Graves, S. B. (1997). The corporate social performance-financial performance link. Strategic Management Journal 18(4), 303-319.

4 Determinants of board of directors and corporate performance with special evidence for real estate companies

4.1 Introduction

Compared to other sustainability related topics, corporate governance – the principles of responsible corporate management and control – and the optimal implementation thereof has for a long time been acknowledged as an important aspect of management in national and international research as well as in public and legislative debates. Over the past decades, the debates reached a climax in the late 90ies when the accounting scandals at Enron and WorldCom shed a less favorable light on the corporate governance regulation in the U.S. As a result, the Sarban Oxley Act was initiated in 2002. However, only a few years later, the financial crisis in 2007/2008 proved that there are still serious shortcomings in the corporate governance quality with devastating financial and social consequences for major economies around the world. Nowadays, the case of Volkswagen AG keeps the debate on good governance and shareholder protection more topical than ever.

The concept of corporate governance roots in the principal agent theory, according to which the increasing separation of ownership and control (management) going along with the individual utility maximization desires of the management results in information asymmetries and as a consequence in management decisions that are not in the best interest of the owners (shareholders) (Berle and Means, 1932; Jensen and Meckling, 1976). Such decisions could be investments in less profitable but highly prestigious projects or short term profit maximization at the cost of environmental or social intactness. Thus, companies suffering from these agency conflicts are characterized by ineffective monitoring systems and disciplining mechanisms aligning management and shareholder interests (Renders et al., 2010). Basically, three main developments are assumed to be the drivers for the increased awareness and importance of corporate governance (Schaefers et al., 2008): Firstly, the increasing institutionalization of shareholding further promotes the separation of ownership and control which in turn leads to investors anticipating corporate governance quality in their investment decisions. Consequently, listed corporations are under pressure to adopt international corporate governance standards (Gillan and Starks, 2003; Kohl, 2009). Secondly, the globalization triggers the further integration of capital markets,

leading to increased competition for international capital. Bad corporate governance is associated with increased financial risk and hence is compensated by significantly higher risk premia that in turn have negative impacts on the corporate valuation (Raskop, 2004; Claessens, 2006). These mainly private economy related governance issues become serious problems for national economies when bad governed corporations are too big to fail and large bail out programs are initiated by the government at tax-payers cost to take protective steps as it was the case in the financial crisis of 2007/2008.

The results of these past developments were mandatory or obligatory corporate governance codes in various countries of the world. In this context, the focus is on the board of directors as one of the most important governance mechanisms that is assumed to be the extension of shareholders in controlling the management. Thus, the board of directors has a critical function of monitoring the management actions on the one hand and advising the management on strategic issues on the other hand. Since every listed company has a board of directors, the performance effects of having such a board cannot be examined due to the lack of variation in the variable of interest. Therefore, one stream of research examines the attributes of the board that is: which *composition* of board of directors could be responsible for differences in performance across companies? In this context, it is analyzed what differences across boards increase the board effectiveness and hence have positive impacts on companies' outcomes, in particular the corporate financial performance. Among others, determinants of board of directors' effectiveness are assumed to be director demographic diversity in the sense of educational background, age, gender, race and ethnicity (Carpenter et al., 2004; Joshi et al., 2011; Joecks et al., 2013; Harjoto et al., 2015). Diverse boards are expected to be more effective because individuals with a broader set of experience, knowledge, age and status can broaden the perspectives and views, have different and unconventional ideas, increase creativity and by this the problem-solving competencies of top management teams. Hence, diverse boards are assumed to promote effective group dynamics and decision-making processes (Carter et al., 2003; Adams and Ferreira, 2009; Harjato et al., 2015). However, cognitive frames are difficult to capture, thus observable characteristics such as age, gender or ethnicities are taken as approximations (Krishnan and Park, 2005; Dezsö and Ross, 2012). Another factor suggested to influence director's decision-making abilities is human capital characteristics. These board director characteristics comprise the skills and experiences ranging from industry knowledge,

CEO leadership experience, finance and venture capital experience to board tenure familiarities with events such as CEO firing or the general familiarity with the company and its sector they are overseeing (McDonald et al., 2008; Kor and Sundaramurthy, 2009; Fahlenbrach et al., 2010; Johnson et al., 2013).

Besides the individuals' demographic and the human capital characteristics, the status of board of directors and the board activity are major topics of research. Jensen and Meckling (1976) invoked first about the role of insider – non-independent – and outsider – independent – board members. Many following researchers focused on the status of board members underlining that outside and independent director are more likely to protect shareholders' interests by exercising higher control. Alongside to investigations on the status of board members, another large stream of research attempts to link board size to firm performance, theorizing that smaller boards dominated by mainly outside directors are more efficient, suffer less from director free-riding and are hence value relevant (Lipton and Lorsch, 1992). Contrary, some scholars also argue that the larger the decision-making group the less extreme and risky the decisions are (Sah and Stiglitz, 1986, 1991). As such, Cheng (2008) prove that companies with larger boards experience lower performance volatility. Also, the intensity of board activity approximated by the number of board meetings per year is further analyzed as a value-driving attribute of board effectiveness. Regular meetings are expected to increase the monitoring abilities of directors since information can be shared and new ideas can be exchanged among outside directors as well as the management. As a result, boards with higher meeting frequencies are more likely to put shareholder interests first and perform their duties according to these maxims (Vafeas, 1999). However, critical voices comment that outside directors are accepting too many outside directorships which in turn have negative impacts on the meeting attendance frequency (Fich and Shivdasani, 2006). Also, increased meeting frequency could be an indication for the lower decision-effectiveness of the board. This short overview has revealed that research results are still mixed. Also, when it comes to the different corporate governance requirements across different sectors, research results are quite limited. For instance, the real estate industry is assumed to have specific corporate governance needs due to the opacities arising out of the particularities of real estate properties. Research on the link between governance and real estate performance, however, is quite scarce and if given, quite reduced to the U.S. Real estate market. This article attempts to close this research gap by extending previous work to the following

new dimensions: It analyses the financial performance effects of several board attributes by using raw level data instead of the common dichotomous or ratio approach (e.g. Gompers et al., 2003). In order to emphasize the differences between raw data approach and aggregated governance ratings, in a first step, rating results are compared for different industrial sub-samples. Furthermore, the unbalanced panel data set is one of the most comprehensive ones covering a maximum of 2,976 companies over 13 years in almost all countries and economies. Thus, it is one of the most comprehensive studies using the Asset4ESG governance data provided by Thomson Reuters. Also, to our best knowledge, the most innovative part is the in-depth analysis of the corporate governance effects on a global basis for the real estate industry. Another positive aspect of this article is the comparative analysis of different sectors in order to find out, whether previous literatures' findings hold for all industries.

Our results show a negative correlation between board size and corporate financial performance. This result holds for all companies' sizes and for all sectors confirming major research in this field. However, concerning the other board characteristics, the results reveal, that there is no *one* good governance attribute all companies should adopt in order to generate positive financial performance effects. Quite the contrary, when it comes to the effect of board activity approximated by the number of annual board meetings or the number of non-executive and independent board members, the results reveal variations across several parameters. As such, real estate companies and smaller companies (in terms of total assets), necessitate greater control exercised by the internal governance mechanism – board of directors. In contrast to this, for the utilities and consumer goods sector and for larger companies the characteristics of this internal control mechanism are not value relevant. Thus, the value relevance of governance has to be determined in a holistic approach considering the company environment.

The paper is structured into 6 sections: The following section considers theoretical background information on corporate governance characteristics by reviewing main empirical works and develops the hypotheses. This chapter also addresses the real estate industry and its specific corporate governance needs. Section 3 is devoted to the methodology and sample characteristics and is followed by the empirical results and robustness checks in section 4 and 5. The conclusion in section 6 sums up the results and provides some conclusive remarks.

4.2 Theoretical background and research hypotheses

4.2.1 Board characteristics and firm performance

Generally, there are mainly two kinds of board of director roles: Firstly, outside directors that have non-management functions, advise the CEO and primarily exercise control over top management and secondly, inside directors whose main duties comprise strategic management activities. As the board is acting on behalf of the shareholders in monitoring and managing the company, outside directors are expected to be more independent the fewer ties (e.g. professional, social or the fact, that the CEO exerts power over them) they have with the executive management, in particular with the CEO. Studies trying to assess the independence of outside directors according to their ties to the CEO mostly differentiate between "affiliated" and "non-affiliated" outside directors (Hermalin and Weisbach, 1988, 1991). This independence in turn has direct impacts on the monitoring activities that is the greater the board independence is the better the management activities of executive board members are monitored. In this context, Fogel et al. (2014) state that strong and independent boards generate 4.2 % higher Tobin's Q-ratios all else being equal. Duchin et al. (2010) extend the performance implications of independent directors to the costs for information gathering. The authors conclude that if the costs of acquiring information about the firm are low, corporate performance increases with additional outside directors, and vice versa. Deutsch et al. (2010) focus on the risk implications of stock option plans for a large U.S. sample of S&P companies over the period from 1997-2006. The results imply that implementing stock option plans for CEO and/or independent board members increases the corporate risk-taking. The effect is stronger for independent board members compared to CEO. However, the effect is substituting when both – CEO as well as independent directors – are granted with stock options, that is: independent directors have a risk-moderating impact on the CEO's risk-taking incentives. A country-specific study with positive results is undertaken by Black and Kim (2012). The authors analyze the impact of board structure on corporate performance for Korean companies. As a consequence of the financial crisis in 1997-1998, the Korean government announced a legislative initiative to reform corporate board structure. According to this initiative of 1999, large Korean companies are obliged to implement a minimum of 50% independent directors on corporate boards by latest 2001. The authors identified the announcement of this legislation as an external shock and analyzed its valuation-

impacts by means of an event study. The results show that with the announcement of the initiative in 1999, investors react positively by valuing large companies compared to mid-sized ones higher, that is 13 % higher Tobin's Q and 46 % higher share price. Later in 2000 and 2001 when the initiative becomes effective, Black and Kim identify no value-corrective actions anymore. Also, for smaller companies adopting the legislative requirements in subsequent years, the value increasing effect is observable.

However, the results are ambiguous as Yermack (1996) and Agrawal and Knoeber (2001) find a negative correlation between the number of outside directors and Tobin's Q. Also, Bhagat & Black (2002) examine the link between the degree of board independence (measured as the difference between the ratio of independent to dependent board directors) and a variety of performance indicators. The results show that firms with low profitability tend to increase the level of independence on the board. However, they cannot find any performance-related evidence that this strategy works. Companies with a higher ratio of independent board of directors do not outperform their peers with lower board independence.

Concerning the size of the board, early scholars like Lipton and Lorsch (1992) suggest that many boards are inefficient due to their large size being an obstacle to meaningful discussions. Yermack (1996) finds proof for the higher effectiveness of smaller boards. In a sample of 452 U.S. companies between 1984 and 1991, the author determines an inverse relationship between board size and Tobin's Q. A similar study is performed by Faleye (2003) with results showing that a large board hinders the board's ability to perform its monitoring function. The research results of Cheng et al. (2008) indicate that companies with large board size have lower performance variability. Hence, the size of the board is negatively correlated to, among others, Tobin's Q, the monthly stock returns and annual return on assets proving that larger boards are less extreme in their decisions since it takes more compromise to reach consensus. Examining a large sample of 2,746 listed companies in the UK over 1981-2002, Guest (2009) finds a strong negative link between board size and firm performance (Tobin's Q and share return). The effect is larger for large companies which tend to have larger boards.

Also, for the banking sector, Pathan et al. (2011) show a negative correlation between size and performance, being more pronounced in the post Sarban Oxley Act of 2002. However, research by Bhagat and Black (2002) reveal no robust correlation between size and performance for a long-term study for the U.S. For the banking sector, Adams and Mehran (2008) find a positive link between size and performance.

4.2.2 The real estate industry's good governance needs

Among practitioners it is assumed that compared to other sectors, the real estate industry particularly needs good corporate governance structures which mainly results out of the sector specifications as well as the attributes of real estate properties itself. That is among others the site-dependency and the heterogeneity of real estate rooting in individual design in combination with location and type of usage. Furthermore, the real estate sector is determined by a lack of transparency concerning the real market value of properties. This is mainly due to the real estate markets being shaped by local conditions, flexibilities in valuations and national valuation methods further exacerbating opacity. Thus, information gathering is quite costly, leading to inefficiencies in the market. As a consequence, shareholders have difficulties to assess and control transactions which further trigger the principal agent problems. Moreover, another, further complicating aspect is that these large assets are predominantly under fiduciary administration. Also, listed real estate companies and REITs related aspects further necessitate good governance. An example for the wide-held assumption that real estate and construction companies need good corporate governance is the German initiative "Initiative Corporate Governance der deutschen Immobilienwirtschaft e.V." which, founded in 2002 by main practitioners and scholars of the sector, aims to produce and establish principles for transparent and professional corporate management in the real estate business.[8] Empirical results for the governance effects in the real estate literature are quite scarce and the given few are focused on the U.S. REIT market. The reason for this unbalanced distribution is the comparably high data transparency of the U.S. REIT market compared to other countries. Early scholars have analyzed the link between top management compensation and key performance indicators for real estate companies. The results show a strong significant positive correlation between compensation and total assets as well as earnings per share (Davis and Shelor, 1995). Based on these preliminary analyses, Friday and Sirmans (1998) focus on the composition of the board of directors in U.S. REITs and its impact on shareholder value. The results show that the ratio of independent board members is positively linked to the market-to-book value of REITs. However, this effect only exists until the threshold ratio of 50 %. Boards with higher numbers of independent board members have rather decreasing market-to-book values. Furthermore, the results show

[8] http://www.immo-initiative.de/en/.

a higher institutional ownership for REITs with good governance as well as an outperformance of this group over a period of two years. Kohl (2009) analyzes for Europe the performance effects of board composition and transparency for listed real estate companies. The results indicate that the board size has negative impacts on Tobin's Q while stock options based compensation has rather positive effects. However, Hartzell et al. (2004) examine the link between board size, board independence, block ownership and institutional ownership to find no effects on Tobin's Q. Other rating based studies find a positive correlation between governance rating and REIT performance (Bauer et al., 2010), however, the effect is only present for REITs with low payout ratios indicating a "REIT-effect". In a multi-country analysis, Edelstein et al. (2010) determine the country-specific governance quality as a factor for excess real estate returns (i.e. required risk premium).

4.2.3 Hypotheses

Considering the presented previous literature, this work is going to undertake a comprehensive study covering a total sample of 2,976 companies over a period of 13 years. The analysis focuses on the link between four board characteristics – size, meeting frequency, percentage of non-executive and independent board members – and corporate financial performance approximated by Tobin's Q. This analysis is also undertaken for 394 real estate companies and REITs in 40 countries. Furthermore, using a fixed effect panel data model, it is possible to control for country as well as firm specific effects, possibly influencing the performance effects of governance quality. Also, to our best knowledge, this is the first study also controlling for diversity effects. In addition to the performance impacts of board attributes in the real estate industry, this article undertakes comparisons to other sectors.

Hence, taking the aforementioned explanation into consideration, we aim to analyze the following hypotheses:

Hypothesis 1.1: *Board size has a negative impact on financial performance.*

Hypothesis 1.2: *The percentage of non-executive/independent board members has a positive impact on financial performance.*

Hypothesis 1.3: *High board meeting frequency increases financial performance.*

Hypothesis 2: *The performance implications of board attributes are specifically higher for real estate and construction companies, reflecting the industry's specific governance requirements.*

Hypothesis 3: *The need for specific governance attributes depend on company particularities such as sector and size.*

4.3 Methodology and summary statistics

4.3.1 Sample selection

The critical sustainability variables of this article are based on the Asset4ESG database by Thomson Reuters. The initial sample covered 3,799 companies from all sectors and industries as well as geographical regions. This sample is adjusted for financial companies due to their different financial as well as governance requirements. The resulting final sample consists of 2,976 companies from 55 countries over a period of 13 years (2003-2015) comprising an unbalanced panel data set of 18,335 observations. As already stated, the data on board composition is derived from Thomson Reuters' Asset4ESG database that rates since 2001 more than 4500 companies worldwide on sustainability aspects and publishes the results on an annual basis. The necessary information are collected manually from all publicly available sources and verified in a comprehensive procedure. Hence, the Asset4ESG rating is one of the most sophisticated and extensive databases on sustainability.

The rating is calculated in several steps. On the basis 400 individual data points companies' environmental, financial, governance and social performance are evaluated. These raw-level data points are aggregated to more than 70 key performance indicators which in turn are used to calculate the category scores for the three sustainability pillars: environmental, governance and social sustainability score. A final aggregation to the overall sustainability score is achieved by a weighted calculation of the pillar scores.

4.3.2 Measures and descriptive statistics

Organizational performance is characterized as multi-dimensional in research (e.g. Miller et al., 2013). In this context, a prevalent dimension is market returns. While other accounting performance oriented measures refer to past or short term financial performance and mainly determine how good a company is in utilizing its assets to generate earnings (Easterwood et al., 2012; Post and Byron, 2015), market performance

measures comprise external perceptions and expectations of the long-term, future performance of an asset. This market valuation of a company is reflected by Tobin's Q, widely used as market performance measure in research (among others: Hartzell et al., 2004; Kohl, 2009; Guest, 2009). Tobin's Q is approximated by calculating the sum of the market value of equity and the book value of debt, divided by the book value of total assets. A Tobin's Q-ratio greater than 1 indicates that for the shareholders the company has a higher value than stated in the balance sheet. However, a value less than 1 reflects investors' expectation about the company destroying value in the future rather than building it up.

Independent variables of interest are several board characteristics reported as annual data points by Thomson Reuters. These are the board size (SIZE) measured as the number board members at the end of fiscal year. As already explained in the previous sections, non-executive directors have monitoring and controlling tasks in the board. Hence, analyzing the number of board size itself might not be meaningful without any information about the distribution of executive and non-executive directors on the board. Hence, NON-EX measures the number of non-executive board directors. In this context, the status of independent and dependent plays an important role. The indicator value variable INDEPENDENT comprises the percentage of independent board members as reported by the company. The value ranges between 0 and 100 percent. The variable MEETINGS comprises the number of board meetings during the year, including all special meetings. This variable is deemed to be an approximation for the interaction, i.e. the activity of the board of directors. All board-related variables are derived from Thomson Reuters' Asset4ESG database. Besides these raw data, three governance ratings are used in an initial comparative approach. Firstly, the total corporate governance pillar score (CGVSCORE) measures the company's systems and processes that ensures the board is acting in the shareholders' best interest. The subordinated category score board functions (CGBF) captures the company's management commitment and effectiveness towards following best practice corporate governance principles related to board activities and functions.[9] The category score board structure (CGBS) measures a company's ability to ensure a well balanced board membership. These three ratings are used in an initial step to compare the sub-samples according to their *overall* governance quality.

[9] Asset4ESG rating description.

The control variables included in the analysis are chosen according to the most common corporate performance determinants as identified by empirical research (e.g. Florackis and Ozkan, 2009; Terjesen et al., 2016). In this context, major corporate aspects with performance implications to control for are the company size, industry and risk (Margolis and Walsh, 2001; Carter et al., 2003; Adams and Ferreira, 2009; Boulouta, 2013; Harjoto et al., 2015). The natural logarithm of total assets controls for the company size. The natural logarithm of total debt is expected to control for corporate risk (Miller and Bromiley, 1990; Waddock and Graves, 1997; Boulouta, 2013; Orlitzky and Benjamin, 2013; Harjoto et al., 2015). Broadly diversified companies are expected to be more complex. Complex companies in turn are assumed to have larger boards and greater needs for sophisticated corporate governance systems. Hence, the variable capital expenditures (capex) serves as an approximation for company diversification. The operational performance is captured by sales growth, calculated as the net sales growth within a year (Harjato et al., 2015). Further measures controlled for are the natural logarithm of free float (the percentage of shares in free float), dividend yield and the ratio of earnings before interest and tax (ebit) to sales as a measure for company's profitability. The financial measures are taken from Datastream. In order to control for any serial correlation among the dependent variables, at least the first lag is used as independent variable in the regression analysis. In the sense of dynamic panel data analysis, this is a quite common approach in research (see e.g. Harjoto et al., 2015; Isidro and Sobral, 2015).

As a robustness check, the sub-sample analysis for different geographical regions is used.

In order to provide some initial assessment of the sample, board structures and key indicators across different sub-samples are compared. For the main sample, the statistics are presented in exhibit 4.1.

Exhibit 4.1| Descriptive statistics of the total sample

	Mean	Median	Max.	Min.	Std. Dev.	# Obs.
Tobin's Q	0.2509	0.2329	2.8787	0.0001	0.1873	18,353
CGVSCORE	63.5714	70.4800	98.7800	1.3500	24.8366	18,353
CGBF	63.6209	73.7200	93.3000	2.3900	25.1900	18,353
CGBS	63.8327	73.0800	96.1900	1.7500	25.5783	18,353
Independent	66.0371	70.0000	100.0000	3.7000	21.7274	18,353
Meetings	8.8753	8.0000	36.0000	3.0000	4.1041	18,353
Non-Ex	78.4697	83.3300	100.0000	4.1700	16.9316	18,353
Size	10.0671	10.0000	31.0000	3.0000	2.9910	18,353
Total Debt	3,672,874	910,400	432,362,000	0,00	15,761,751	18,353
Total Assets	15,230,622	3,957,001	1,029,139,000	17,585	48,497,902	18,353
Capex	599,186.61	111,049.30	38,378,803.84	49.3830	1,740,227.00	18,353
Free Float	74.3306	81.0000	100.0000	2.0000	22.4841	18,353
Sales Growth	0.1054	0.0729	1.6735	-0.8308	0.2409	18,353
Ebit Sales Ratio	0.1538	0.1182	0.9293	-0.5219	0.1684	18,353
Dividend Yield	2.3726	1.8700	281.4500	0.0000	3.3389	18,353

Source: Own illustration.

The descriptive statistics provide an overview over important aspects of the total sample. Concerning financial performance, the sample's Tobin's Q ranges between the maximum of 2.8787 and the minimum of 0.0001, while the average company has a Tobin's Q of 0.2509. The median of 0.2329 is quite close to the mean, indicating an even distribution of the data around the mean and no great outliers distorting the results.

Concerning board of director ratings, the statistical examination of the two governance category scores CGBF and CGBS exhibits a very similar distribution for both scores. The mean score is 63.6209 % for CGBF with a standard deviation of 25.1900 % and 63.8327 % for CGBS with a respective variation of 25.5783 % around mean. For board functions, the minimum score is 2.3900 %, while the maximum score is 93.3000 %. Concerning board structure these values range between 1.7500 % and 96.1900 %. Hence, the sample contains the whole range of companies with exemplary good corporate governance and companies with worse governance which is quite useful for the further regression analysis. Breaking down this category score into their four selected elements, the distribution shows that the average company in the sample has about 10 board members, whereby the minimum number of directors is 3 and the largest board comprises 31 board members. The median of 10 indicates a quite even distribution. Furthermore, the average company has about 78.4697 % non-executive directors. Since

the sample covers one-tier as well as two tier board model, the maximum of 100 % should be interpreted for the two-tier board system where the supervisory board only comprises non-executive board members. In the ordinary least squares regression analysis, the fixed effects panel model will control for the effects of different board systems. The average board has 66.0371 % independent directors. Within the sample, there are also companies with 100 % independent directors as well as the minimum of 3.70 %. The explanation for the large gap and the maximum number is similar to that of non-executive directors. When it comes to the single governance elements of the CGBF score, the results exhibit that the average board meets about 8.8753 times a year. However, the maximum of 36 meetings is about four times higher. An explanation for this high meeting frequency could be special circumstances such as merger and acquisitions or major developments in the corporate strategy necessitating higher exchange of information.

The further financial and general company data show the following structure: The average company has total debt of 3,672,874 EUR. The maximum number is 432,362,000 EUR with a standard deviation of 15,761,751 EUR. The total assets range between 17,585 EUR and 1,029,139,000 EUR with a mean of 15,230,622 EUR and a median of 3,957,001 EUR exhibiting good variation in the sample. The sample statistics uncover an average free float of 74.3306 %. High free float numbers indicate an increased attempt to shareholder value maximization. However, high free float also shifts the power more to the management. Hence, good governance becomes specifically important. The mean sales growth is about 10.5400 % while the average operating profit margin approximated by the ebit sales ratio is 15.3800 %. The average company in the sample has a dividend yield of 2.3726. Several of the variables will be used as logged in the analysis to correct for skewness.

The descriptive statistics of the various sub-samples (real estate, industry, utilities & consumer goods and technology) concerning sustainability variables are presented in exhibit 4.2.

Exhibit 4.2| Descriptive statistics of various sub-samples

Exhibit 4.2.1|Descriptive statistics real estate sub-sample concerning governance characteristics

	Mean	Median	Max.	Min.	Std. Dev.	# Obs.
CGVSCORE	65.33	70.70	97.15	3.01	22.54	1177
CGBS	68.18	77.67	94.02	2.97	24.12	1177
CGBF	66.32	75.72	92.65	5.85	22.68	1177
Size	9.80	10.00	22.00	4.00	2.75	1177
Non-Ex	76.39	81.82	100.00	12.50	16.61	1177
Independent	66.59	70.00	100.00	10.00	20.44	1177
Meetings	8.38	7.00	33.00	3.00	4.04	1177

Exhibit 4.2.2|Descriptive statistics industry sub-sample concerning governance characteristics

	Mean	Median	Max.	Min.	Std. Dev.	# Obs.
CGVSCORE	69.62	75.76	96.81	1.53	21.65	2257
CGBS	69.34	78.20	93.72	2.42	22.69	2257
CGBF	68.09	77.14	92.23	2.49	21.40	2257
Size	9.89	10.00	23.00	3.00	2.57	2257
Non-Ex	80.13	85.71	100.00	14.29	14.60	2257
Independent	70.51	75.00	100.00	10.00	19.87	2257
Meetings	8.26	8.00	25.00	3.00	3.25	2257

Exhibit 4.2.3|Descriptive statistics utilities & consumer goods sub-sample concerning governance characteristics

	Mean	Median	Max.	Min.	Std. Dev.	# Obs.
CGVSCORE	69.68	75.25	97.90	2.12	20.91	3494
CGBS	69.57	77.84	96.19	2.90	22.20	3494
CGBF	69.37	78.57	93.12	2.44	20.74	3494
Size	10.76	11.00	23.00	4.00	2.68	3494
Non-Ex	80.58	84.62	100.00	14.29	13.90	3494
Independent	68.59	73.33	100.00	6.25	19.97	3494
Meetings	8.33	8.00	36.00	3.00	3.61	3494

Exhibit 4.2.4|Descriptive statistics technology sub-sample concerning governance characteristics

	Mean	Median	Max.	Min.	Std. Dev.	# Obs.
CGVSCORE	70.63	77.44	97.36	2.73	21.89	1030
CGBS	68.73	78.49	95.36	2.72	24.34	1030
CGBF	68.85	79.35	92.88	2.82	22.31	1030
Size	10.01	10.00	22.00	3.00	2.72	1030
Non-Ex	82.35	85.71	100.00	16.67	12.98	1030
Independent	71.49	77.78	100.00	12.50	20.20	1030
Meetings	9.11	8.00	35.00	4.00	3.94	1030

Source: Own illustration.

Exhibit 4.2 presents an overview of different board characteristics for the real estate, industry, utilities & consumer goods and technology sub-samples. The comparative results show that concerning board governance all industries are quite close to each other, though slight differences can be determined: As such, the real estate industry has on average the smallest board size with 9.80 directors. However, the real estate sector has also the lowest percentage of non-executive and independent board members. These non-executive and especially, independent directors in turn are suggested to be essential for good and sufficient corporate control. Hence, the comparably low internal control mechanisms support the previous assumptions about the specific governance needs of real estate and construction companies. An initial comparison of the overall governance score confirms this perception: the real estate industry has the lowest CGVSCORE (average 65.33 %, with the lowest median being 70.70 %). Already this initial comparison helps to have a first indication for the hypothesis. When taking governance ratings as a comparison factor, the real estate industry suffers from lower corporate governance quality compared to the utilities, technology and industrial sectors. The following regression analysis focuses on whether these average differences in governance have an impact on the corporate performance, i.e. whether, in particular, real estate and construction companies would increase financial performance by investing in the four board characteristics mentioned previously.

Exhibit 4.3| Correlations of the variables

	Tobin's Q	CGVSCORE	CGBF	CGBS	Indepen-dent	Meetings	Non-Ex	Size	Total Debt	Leve-rage	Total Assets	Capex	Free Float	Sales Growth	Ebit sales Ratio	Divi-dend Yield
Tobin's Q	1															
CGVSCORE	0.0011	1														
CGBF	0.0225***	0.7938***	1													
CGBS	-0.0118	0.7452***	0.6824***	1												
Independent	-0.0039	0.5501***	0.5804***	0.5895***	1											
Meetings	0.0805***	-0.0065	0.0180**	-0.0498***	-0.0639***	1										
Non-Ex	0.0288***	0.3642***	0.3999***	0.3326***	0.6264***	-0.0816***	1									
Size	0.0699***	0.0196***	0.0213***	-0.1640***	-0.1234***	-0.0849***	0.0566***	1								
Total Debt	0.1618***	0.0464***	0.0378***	-0.0027	0.0188**	0.0793***	0.0337***	0.1720***	1							
Leverage	0.9290***	0.0677***	0.1031***	0.0857***	0.0591***	0.0453***	0.0555***	-0.0134*	0.0696***	1						
Total Assets	-0.0153**	0.0695***	0.0562***	-0.0108	0.0301***	0.0680***	0.0532***	0.2297***	0.7321***	-0 .0865 ***	1					
Capex	0.0272***	0.0696***	0.0290***	-0.0317***	0.0125*	0.0485***	0.0356***	0.2113***	0.3128***	-0.0163**	0.4152***	1				
Free Float	0.0030	0.3474***	0.2850***	0.3300***	0.3685***	0.0778***	0.0914***	-0.0784***	0.0489***	0.0342***	0.0666***	0.0155**	1			
Sales Growth	0.0024	-0.0123*	-0.0079	-0.0066	-0.0117	-0.0116	0.0031	0.0038	-0.0023	0.0029	-0.0029	-0.0022	-0.0082	1		
Ebit Sales Ratio	0.0112	0.0048	-0.0038	0.0024	0.0033	-0.0206***	-0.0008	0.0190**	0.0059	-0.0003	0.0076	0.0068	-0.0103	0.0004	1	
Dividend Yield	0.1125***	0.0065	-0.0320***	-0.0286***	-0.0432***	0.0671***	0.0263***	0.0389***	0.0279***	0.0928***	0.0413***	0.0451***	0.0271***	-0.0075	0.0187**	1

This exhibit 4.3 shows the Pearson Correlations for the variables used in the analysis. The significance level is according to the p-values: *p<0.1; **p<0.05; ***p<0.01, t-values in parenthesis. The governance scores CGVSCORE, CGBF and CGBS indicate high correlations with each other. Therefore, these variables are not used simultaneously.
Source: Own illustration.

4.4 Empirical results

4.4.1 Empirical results for the complete data set

The core part of the empirical analysis is the examination of the link between corporate board attributes and corporate financial performance by means of multivariate ordinary least squares regression analysis while controlling for external factors determining financial performance (e.g. company size and risk). As an initial step of the panel regression, the appropriateness of a fixed or random effects model for the regression analysis is determined. For this purpose, the Hausman test is applied which is based on the essential assumption that the random effects are not correlated with any explanatory variables. Consequently, the results of the test end up in a p-value of 0.000 indicating the abandonment of the random effects model (results not tabulated here). Hence, the resulted fixed effects model controls for time-invariant firm and country specific attributes. Since multicollinearity is one of the major problems of panel data, at least the first lag of the dependent variable is included as an explanatory factor. In order to determine the right number of lags, the analysis is repeated with different lags until the best model fit is found and multicollinearity is eliminated. Mostly, these are three lags of Tobin's Q. This approach is performed also for the hereafter following ordinary least squares estimations. The variance inflation factor ranged less than 5 and the Durbin Watson test is about 2 indicating no serious multicollinearity. Furthermore, white cross section coefficient covariance method is chosen to control for heteroscedasticity. Since the total sample of up to 18,353 observations suffered from skewness, the natural logarithm of the respective parameters is taken. The regression results of the total unbalanced sample are tabulated in exhibit 4.4.

Exhibit 4.4| Regression results for board characteristics with Tobin's Q

	Dependent variable
	Tobin's Q
Size	-0.001485*** (4.51302)
Meetings	0.001442*** (3.467573)
Non-Ex	-0.000197 (1.233243)
Independent	0.000103* (1.702484)

Total Debt (log)	0.062439*** (15.704261)
Total Assets (log)	-0.06764*** (8.139438)
Capex (log)	0.004998*** (2.724142)
Free Float (log)	-0.001465 (0.355808)
Sales Growth	-0.000956* (1.801717)
Dividend Yield	0.000489 (1.547418)
Ebit Sales Ratio	0.000319*** (4.157102)
Tobin's Q (1 lag)	0.372061*** (6.537319)
Tobin's Q (2lag)	-0.052367** (1.963159)
Tobin's Q (3 lag)	-0.052486** (2.474347)
C	0.340076*** (3.817643)
Fixed Effects	Yes
R^2	0.8925
# Observations	15,294

Significance of coefficients are marked as *p<0.10; **p<0.05; ***p<0.01 while t-values are given in parenthesis.
Source: Own illustration.

The results of the regression analysis show that the size of the board has a significant negative correlation with the market performance (Tobin's Q), though the magnitude of the correlation is weak (-0.001485). However, the coefficient is significant at the 1 % significance level. Concerning the meeting frequency of the board of directors, the results reveal a significant positive correlation with Tobin's Q. Hence, from the market performance point of view, the general expectation of a positive correlation is confirmed. In other words, investors' assumption about boards that meet up more frequently and by this exchange ideas and information faster and perform its monitoring duties more accurately is generally confirmed. Thus, a high meeting frequency might trigger the general market beliefs and impressions that the directors' are busy in exchanging information and exercising desired control.

Moreover, in contrast to previous research, the percentage of non-executive directors has a negative impact on financial performance. This result is quite interesting because

non-executive directors are generally expected to monitor the top management and increasing the number of non-executive directors in the board is expected to increase the performance due to better governance. However, the coefficient of the variable Non-Ex is not significant at any of the common significance level, indicating that the role of the directors is not value relevant in a holistic sample approach. In contrast to this, directors' independence has a significant positive impact. Hence, from the market performance view, the independence of directors' is value relevant. Consequently, adding non-executive directors' may not add to board effectiveness if independence is not given. The models' goodness of fit R^2 is 0.8925 which means that about 90 % of the variations can be explained by the model.

4.4.2 Empirical results for various sub-samples

In order to get further insights into possible sector specific effects of board attributes, an analysis for different sub-samples is undertaken. The intention is to find out whether the above stated results also hold for different sectors. The assumption is that governance needs are specifically determined by company's environment and thus subject to variations. The results of this additional sub-sample analysis are presented in exhibit 4.5.

Exhibit 4.5| Regression results for board characteristics with Tobin's Q for different sub-samples

	Dependent variable Tobin's Q		
	Sub-sample		
	Utilities & consumer goods	**Technology**	**Industrial**
Size	-0.001321*** (2.856353)	-0.00222** (2.079821)	-0.001635* (1.711376)
Meetings	0.000764 (1.642433)	0.000232 (0.565561)	0.001016** (2.019879)
Non-Ex	-0.000189 (0.862400)	-0.000823*** (2.852598)	0.0000495*** (0.342286)
Independent	-0.00000711 (0.066822)	0.00091*** (3.018193)	-0.000129 (1.583573)
Total Debt (log)	0.065903*** (14.62494)	0.05438*** (12.48311)	0.046149*** (8.702992)
Total Assets (log)	-0.061675*** (8.559638)	-0.047082*** (5.509881)	-0.01925* (1.898376)
Capex (log)	0.007346*** (3.096533)	-0.005454 (1.102127)	0.005033 (1.434212)

Free Float (log)	0.004531 (0.78074)	-0.000789 (0.07501)	-0.005424 (0.834004)
Sales Growth	-0.001278 (0.280498)	-0.010195 (1.225534)	0.013305 (1.576237)
Dividend Yield	0.000838 (0.890965)	0.002145** (2.399618)	0.000656 (1.359341)
Ebit Sales Ratio	-0.074877*** (4.081528)	-0.105356*** (3.763768)	-0.133965*** (6.239968)
Tobin's Q (1 lag)	0.400367*** (7.98129)	0.314391*** (4.040668)	0.393212*** (10.96929)
Tobin's Q (2 lag)	-0.042992 (1.094731)	-0.087289** (2.012703)	-0.057976* (1.89908)
C	0.150126** (2.560177)	0.288639** (2.311137)	-0.166829 (1.593026)
Fixed Effects	Yes	Yes	Yes
R^2	0.9172	0.887652	0.91623
# Observations	4,896	1,421	3,140

Significance of coefficients are marked as *p<0.10; **p<0.05; ***p<0.01 while t-values are given in parenthesis.
Source: Own illustration.

The results provide interesting insights into different industries and exhibits for the first time that the value relevance of major board characteristics are industry dependent. First of all, for all sectors, the size of the board of directors exerts negative significant effects on the financial performance while the highest effect is observed for the technology sector. The meeting frequency has a positive performance effect in all analyzed sub-samples, however, the effect is only significant and the highest for companies in the industrial sample. The impact of the number of non-executive and independent directors has the highest differences across the sectors. As such, in the technology sector it has a significant negative financial effect, while in the industrial sub-sample the effect is significantly positive, at the highest significance level of 1 %. For the utilities & consumer goods sub-sample, the effect is not significant. Hence, companies in the technology sector can positively influence their performance by increasing the number of independent, non-executive directors. These two characteristics are jointly significant. For industrial companies increasing the number of non-executive directors is already enough in supporting financial performance in a positive way, since the status, whether dependent or independent is irrelevant. Hence, from the important market point of view, investors in different sectors, appreciate different board characteristics. In the relatively new, fast changing and highly information-affine technology sector, it is

important to have a small board of directors with increased number of non-executive and independent board members. The status of independence is of significant importance for the success of the companies. For the rather relatively long established industrial sector, investors appreciate a small board with high meeting frequency and large number of non-executive directors. The status of independence has a rather negative, hindering impact, though the effect is not significant. The utilities & consumer goods industry is the only industry that has the highest value-resistance towards changes in the board structure. Generally assumed value-driven determinants such as the board activity, the number of non-executive directors or the director's independence are not value relevant. A reason for this could be the exposure of the industry to the public based on the nature of their business, the products and services they offer to private consumers. For example, a producer of convenience goods is exposed to the public and is called to account very quickly for any mistakes harming the customers. Missteps can go viral very fast and the resulting image damages can be costly very quickly. Hence, the external business environment works itself as a good controlling mechanism. Furthermore, high governmental regulations concerning consumer protection etc. are further controlling mechanisms for companies in this sector.

4.4.3 Empirical results for the real estate industry

Considering that the different sectors are significantly determined by different board characteristics it is of special interest to understand how the real estate sector is affected in this context. Due to restricted data, only the first lag of the dependent variable is used in the estimation model. The results are summed up in exhibit 4.6.

Exhibit 4.6| Empirical results for the real estate sub-sample

	Dependent variable
	Tobin's Q
Size	-0.002847*** (2.707572)
Meetings	-0.001155 (1.602758)
Non-Ex	0.00024 (1.0714)
Independent	-0.000445*** (2.711337)

Total Debt (log)	0.040644*** (7.848694)
Total Assets (log)	-0.045976*** (4.35132)
Capex (log)	0.007209*** (3.179021)
Free Float (log)	0.003036 (0.408409)
Sales Growth	0.001414 (0.267718)
Dividend Yield	0.000468 (0.588169)
Ebit Sales Ratio	-0.038673*** (3.81021)
Tobin's Q (1 lag)	0.458055*** (9.830266)
C	0.283463*** (3.106687)
Fixed Effects	Yes
R^2	0.9431
# Observations	1,873

Significance of coefficients are marked as *p<0.10; **p<0.05; ***p<0.01 while t-values are given in parenthesis.
Source: Own illustration.

Firstly, the previous results concerning the negative effects of large corporate boards are also confirmed for the real estate sector. Hence, also for real estate and construction companies, large board of directors lead to decision-inefficiencies, i.e. the costs of additional directors outweighs the benefits of for example additional know-how and/diversity. Furthermore, in contrast to other sub-samples (exhibit 4.5), there is an inverse relationship between board meeting frequency and corporate market performance, approximated by Tobin's Q. Despite the coefficient is not significant at any common significance level, real estate and construction companies do not profit from higher meeting frequency, i.e. high meeting frequency is rather an indicator for decision-lethargy and lower efficiency. Another interesting aspect is that the sector profits from increasing percentage of non-executive directors, however, the coefficient of the variable is not significant. Furthermore, in contrast to previous literature, independent directors in real estate companies' boards are an obstacle to financial performance. A possible reason for this divergent result may be that compared to other sub-samples, independent directors may increase controversies arising out of lower homogeneity that

in turn leads to less decision and communication efficiency. Thus, the number of independent board members might go along with increasing conflicts and as a result in lower decision-making efficiency. The coefficient is significant at the strictest significance level of 1 %. Hence, from investors' valuation point of view, real estate companies with small boards and lower number of independent board members experience highest market valuation.

The question whether real estate and construction companies have specific governance needs can be affirmed partly. The results provide indication that in comparison to other sectors, real estate companies do not have specific governance needs when it comes to the board size. Like other sectors, real estate and construction companies suffer financially from large boards. However, neither meeting frequency nor the control exercised by non-executive directors has financial performance impacts like it is the case for industrial or technology companies. In addition, contrary to industrial companies, independent board members in real estate boards have significant negative financial performance implications. Though the effect is also negative for utilities & consumer goods as well as technology companies, the coefficients are not significant in these cases at any common significance level. Thus, concerning independent board members, the real estate sector has specific needs.

4.4.4 Empirical results for different company sizes

Taking the varying results for different sectors into account, the next logical step is to analyze whether company specific characteristics, in particular, the company size, determine the value-relevance of board attributes. Specifically, the following ordinary least squares panel data regression is undertaken for large and small companies to determine the performance implications of board of directors' attributes for these sub-samples. The initial total sample is divided into small and big companies according to the amount of total assets. For this, the median of the total assets is taken. Companies larger than the median are indicated as "big", while companies with total asset smaller than the median are assigned as "small". The results of the unbalanced fixed effects panel data regression are presented in the following exhibit 4.7.

Exhibit 4.7| Empirical results for small and big companies

	Dependent variable Tobin's Q	
	Small	**Big**
Size	-0.002888*** (3.585771)	-0.001321*** (2.856353)
Meetings	0.002054** (2.075843)	0.000764 (1.642433)
Non-Ex	-0.000464** (2.173596)	-0.000189 (0.862400)
Independent	0.000193* (1.824713)	-0.000007 (0.066822)
Total Debt (log)	0.055026*** (12.28621)	0.065903*** (14.62494)
Total Assets (log)	-0.05667*** (4.921976)	-0.061675*** (8.559638)
Capex (log)	0.005347*** (4.311949)	0.007346*** (3.096533)
Free Float (log)	-0.000382 (0.075269)	0.004531 (0.78074)
Sales Growth	0.001638 (0.223011)	-0.001278 (0.280498)
Dividend Yield	0.000324 (1.285975)	0.000838 (0.890965)
Ebit Sales Ratio	-0.017641 (0.636692)	-0.074877*** (4.081528)
Tobin's Q (1 lag)	0.338449*** (5.990642)	0.400367*** (7.98129)
Tobin's Q (2 lag)	-0.075673** (2.463078)	-0.042992 (1.094731)
C	0.284113** (2.553385)	0.150126** (2.560177)
Fixed Effects	yes	yes
R^2	0.8683	0.91715
# Observations	5,814	4,896

Significance of coefficients are marked as *p<0.10; **p<0.05; ***p<0.01 while t-values are given in parenthesis.
Source: Own illustration.

The comparison between the two samples reveals that compared to large companies, the examined board characteristics have an increased significant impact on the financial performance of smaller listed companies. Hence, the internal governance mechanism – board of directors – and the structure thereof plays an important value-determining

role. Consequently, the corporate governance, i.e. the corporate controlling needs of smaller companies are higher compared to larger corporations.

A detailed consideration of the respective board variables reveals the following conclusions: For the variable board size, the results are in accordance to previous research and the above determined outcomes for different sectors, i.e. the size of the board of directors has significant negative effects on the corporate financial performance. Furthermore, the annual meeting frequency has a positive financial influence being significant at the 5 % level. Hence, for smaller companies the beneficial effects of frequent meetings going along with increased information exchange is higher than the costs accrued thereby. Also, a stepwise adding of the four variables of interest, shows that the status of independence becomes significant when the variable non-executive directors is added to the regression equation. Thus, it can be assumed that these variables are jointly significant. While the number of non-executive directors exerts negative effects, the directors' status of independence has positive impacts. As a result, for smaller companies, it is important to have an independent and small board with high meeting frequency. For larger companies, the only financial performance affecting characteristic is the board size. A reason for the discrepancy between large and small companies could be that due to their size, larger companies are mostly multinational and therefore, have other control mechanisms. In this context, the public and the government going along with the increased competitiveness and pressure of larger companies to maintain good image and publicity are itself effective external control mechanisms. Furthermore, international competition for fresh capital increases the pressure, too. Therefore, investments in a specific board composition such as increasing the number of non-executive and independence directors or the meeting frequency to reach a good internal governance/controlling mechanism are not relevant for the corporate financial performance of large companies. In contrast to this, smaller companies tend to increase their capital from local markets. Furthermore, due to their smaller size, the public awareness is comparatively lower. The reason for this are for example lower number of employees, lower supra-regional or national impacts and certainly also lower tax payments due to lower revenues compared to large, multinational companies. Hence, for smaller companies, the pressure out of international competition for fresh capital and international positive image is comparatively small. Thus, internal governance mechanisms have higher and significant financial performance weights. For this group of companies it does pay off to invest in

non-executive and independent board members or pay the directors' fees for additional meetings.

4.5 Robustness test

The results presented in the previous sections show that the board characteristics of interest have varying impact for different samples. Hence, the robustness check is performed to explore whether the results are trustworthy. For this, the sample is divided into different sub-samples according to geographic regions, in particular Europe, U.S. and East & Asia. The following exhibit 4.8 summarizes the results.

Exhibit 4.8| Empirical results for different geographical regions

	Dependent variable Tobin's Q		
	Europe	**U.S.**	**East & Asia**
Size	-0.002511*** (4.664908)	-0.000544* (1.800744)	-0.001078** (2.008809)
Meetings	0.00166** (2.536549)	0.001362** (2.262358)	0.000607** (2.249728)
Non-Ex	-0.000396*** (2.823547)	-0.000664*** (2.632948)	-0.000215* (1.65079)
Independent	0.0000367 (0.496534)	0.000456*** (2.727048)	0.0000841 (0.353298)
Total Debt (log)	0.060193*** (8.694525)	0.065186*** (13.43511)	0.049071*** (11.93817)
Total Assets (log)	-0.07089*** (3.25264)	-0.058185*** (6.25172)	-0.031309*** (8.374035)
Capex (log)	0.007896** (2.237109)	-0.000195 (0.083052)	0.003769** (2.246288)
Free Float (log)	-0.002247 (0.46856)	0.010427 (1.575014)	-0.003871* (1.679146)
Sales Growth	0.008455 (1.530213)	-0.003772 (0.480296)	-0.005952 (1.336036)
Dividend Yield	0.0011 (1.334671)	0.000574** (1.274314)	0.000133* (1.698766)
Ebit Sales Ratio	-0.047751*** (3.016256)	-0.009231 (0.473438)	-0.103968*** (5.759677)
Tobin's Q (1 lag)	0.287094*** (3.160955)	0.423813*** (8.545759)	0.275276*** (5.80866)
Tobin's Q (2 lag)	-0.025718 (0.462826)	-0.096168*** (3.423204)	
C	0.421083* (1.883061)	0.15887 (1.366448)	0.003591 (0.057483)

Fixed Effects	yes	yes	yes
R^2	0.9028	0.9056	0.9387
# Observations	4,042	5,825	2,978

Significance of coefficients are marked as *p<0.10; **p<0.05; ***p<0.01 while t-values are given in parenthesis.
Source: Own illustration.

The results for three of the four board characteristic variables are confirmed: The size of the board exerts significant negative impacts on corporate performance for all geographic sub-samples. Hence, increasing the number of board members leads to inefficiencies such as higher costs, lower board dynamics and less effective decision-making. Hereby, the effect is the highest for companies in Europe. Concerning meeting frequency, the results are similar for all regions: a significant positive effect indicating that companies in general profit from higher information exchange. Again, for European companies the performance implications are the highest. The number of non-executive board members has also a negative significant effect for all regions. As a result, for all examined regions, there must be more effective control mechanisms than the number of non-executive directors. Though, the independence of board members is positively correlated to the companies' financial performance, the effect is only significant for the U.S. sample. Thus, only in the U.S. companies can increase their financial performance by increasing the number of independent directors. However, the overall results meet the goal to determine the explanatory power – thus the robustness – of the model. For the first three board determinants this can be confirmed. For board independence, the results vary also concerning geographical distribution. In addition, analyzing the first and second lag of board characteristics to determine whether the past board composition and determinants have an effect on corporate financial performance did neither show a significant effect nor improved the model fit (results are not tabulated). Consequently, the actual year governance performance has the above mentioned impact on the financial performance of a company, i.e. if companies want to influence their performance, they might change the board determinants of that year.

4.6 Conclusion and discussion

One of the main reasons for the increased attention to corporate governance and, in particular, to the composition of the board of directors has been the published corporate scandals of recent years (e.g. Volkswagen AG, Lehman Brothers and Enron). The consequence of all scandals is the same: financial losses for the shareholders, the state and the taxpayers.

However, another reason for the increased attention is societies' and investors' increased appreciation of sustainability triggered by the threatening anthropogenic climate change and natural catastrophes. Since all sustainability dimensions interact they are equally important for one another. Consequently, corporate governance affects the other dimensions – social and environmental – if not paid attention to as the case of Volkswagen AG has demonstrated impressively. Hence, the *right* performance of the monitoring duties depends strongly on the effectiveness of the board of directors and has been addressed in an extensive number of research studies. In this context, the board of directors as a high performing team is in the center of attention, examining what combination and characteristics determine the best controlling and management of companies. Thus, the main question is: How should companies construct their board of directors to achieve best financial outcomes?

The aim of this article is to find a possible answer to this question. It analyzes the performance implications of board of directors' characteristics, in particular the board size, the board meeting frequency, the percentage of non-executive and independent board members on the corporate financial performance by examining a vast, global unbalanced panel data set of 2,976 companies over a period of 13 years. The results reveal the following:

1) *Large boards have negative effects on Tobin's Q.*

Large corporate boards are inversely related to corporate financial performance approximated by Tobin's Q. Hence, in line with major previous work, this study can confirm the negative financial impacts of large boards, i.e. large boards lead to lower monitoring and management efficiency, higher costs and less efficient information exchange that in turn result in lower financial performance. The results for this board determinant are stable and valid across different industries, company sizes and

geographical regions. Thus, lean board structures do prevent free riding tendencies, promote effective communication, speed-up decision-making processes, increase overall controlling activities and reduce costs of additional directors. Also, from the market performance view, i.e. investors' perspective reflected in Tobin's Q, companies with smaller boards are of higher value, revealing that smaller corporate boards are associated with better governance and shareholder value creation.

2) The real estate industry has specific governance needs.

Also, for the real estate industry, large boards have a significant negative effect on corporate financial performance. Hence, concerning board size, the real estate sector does not have any special governance needs compared to other sectors. However, when taking other board characteristics into account, the real estate industry has its own divergent governance needs: For instance, financial performance does not improve with higher board of directors' meeting frequency or increased number of non-executive directors, since both coefficients are not significant. In contrast to other sectors, real estate companies profit from decreasing number of independent board members. The reason for this might be the increased heterogeneity and controversies independent director bring resulting in slower decision-making and higher communication inefficiencies. Consequently, the results prove that there is not one governance concept that fits all companies.

3) Smaller companies have a higher need for good governance.

The results of the comparison between large and small companies – differentiated according to their total assets – revealed that smaller companies have a greater need for extensive internal governance mechanism such as the board of directors. The ordinary least squares regression results show that all four board determinants have a significant impact on the corporate financial performance. For large companies only the board size exhibit significant negative correlation to financial performance measures, i.e. with increasing board size companies experience financial drawbacks. The reason for these differences might root in different controlling mechanisms: For large companies the market, the public and the government itself serve as controlling mechanisms due to their exposure and their size. Smaller companies might make up for the lack of these

additional external governance mechanisms by increasing specific internal corporate governance. Hence, the meeting frequency and the number of independent board members support company performance positively while increased number of non-executive board members has a rather negative effect.

4) There is no one "good governance" concept.

The above mentioned differing results for the various sub-samples suggest in contrast to major previous literature that there is no *one* "good governance" concept with general validity for all companies and industries. This study rather reveals that the governance needs depend on the sector the company is active in as well as the size of the company. Hence, in building the governance structure of the company, the management and shareholders have to pay attention to the specific governance needs arising out of the sector and the company itself. That is, before investing in increased numbers of independent or non-executive directors or higher board meeting frequencies, the company size and sector as well as the market conditions should be taken into consideration. This way the highest and best performance implications can be generated. For instance, the major previous literatures' aspirations for increased number of non-executive board members and their positive performance effects might not be positive and significant for all companies and industries. The results find evidence that compared to the technology and industrial sector, utilities & consumer goods companies are only financially sensitive to changes in the board size. As a result, putting large efforts in increasing the meeting frequency or the number of non-executive or independent directors would not pay off for these companies. A reason for the divergence might be the special public control mechanisms of these companies, i.e. companies producing consumer goods target individuals and household and bad control mechanisms leading to hazardous effects for human beings or environment might be taken into account by the public much faster than other sectors. Where external control fail to be effective, companies need increasing internal governance mechanisms to ensure good corporate control. Hence, this study extends the current research results on board of directors to the extent that inflexible structures are not suiting all industries. Rather, every industry has its specific needs and therefore, overall comparability is not given, except for the overall agreement on the negative effects of large board sizes.

However, unlike previous research the magnitude of the effects is low. Therefore, these results should be interpreted with caution since one of the major shortcoming of empirical research concerning the link between board composition and corporate financial performance is endogeneity of board composition. Moreover, panel data analyses somehow always suffer from serial correlations making another potential source of errors. Therefore, potential new research areas could be the analysis of the effects on shareholder return, corporate risk or the usage of more sophisticated new analysis methods to determine the effects. Also, an industry in depths cross-section analysis might deliver further insights and extend this initial work.

4.7 References

Adams, R., B. Hermalin, and M. Weisbach. 2010. The Role of Boards of Directors in Corporate Governance: A Conceptual Framework & Survey. Journal of Economic Literature 48:58-107.

Adams, R. B. and Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. Journal of Financial Economics 94(2), 291-309.

Agrawal, A. & Knoeber, C. (2001).Do Some Outside Directors Play a Political Role? Journal of Law and Economics 44(1), 179-198

Bauer, R., Eichholtz, P. & Kok, N. (2010). Corporate governance and performance: the REIT effect. Real Estate Economics 38(1), 1-29.

Bhagat, S., & Black, B. (2002). The non-correlation between board independence and long-term firm performance. Journal of Corporation Law 27(2), 231-273.

Berle, A./Means, G. (1932), The Modern Corporation and Private Property, New York 1932.

Black, B. & Kim, W. (2012). The effect of board structure on firm value: A multiple identification strategies approach using Korean data. Journal of Financial Economics 104(1), 203-226.

Capozza, D. R. & Seguin, P. J. (2003). Inside Ownership, Risk Sharing and Tobin's Q-Ratios: Evidence from REITs. Real Estate Economics 31(3), 367-404.

Carpenter, M. A., Geletkanycz, M. A. & Sanders, W. G. (2004). Upper Echelons research revisited: Antecedents, elements, and consequences of top management team composition. Journal of Management 30(6), 749-778.

Carter, D. A., Simkins, B. J. and Simpson, W. G. (2003). Corporate Governance, Board Diversity, and Firm Value. The Financial Review 38(1), 33-53.

Cheng, S. (2008). Board size and the variability of corporate performance. Journal of Financial Economics 87(1), 157–176.

Claessens, S. (2006), Corporate governance and development, in: The World Bank Research Observer, Vol. 21, S. 91-122.

Coles, J. L., Lemmon, M. L. & Meschke, J. F. (2007). Structural Models and Endogeneity in Corporate Finance: The Link Between Managerial Ownership and Corporate Finance. Journal of Financial Economics 103(1), 149-168.

Davis, B. J. & Shelor, R. M. (1995). Executive Compensation and financial performance in the real estate industry. The Journal of Real Estate Research 10(2), 141-151.

Deutsch, Y., Keil, T. & Laamanen, T. (2010). A dual agency view of board compensation: The joint effects of outside director and CEO stock options on firm risk. Strategic Management Journal 32(2), 212-227.

Dezsö, C. L., & Ross, D. G. 2012. Does female representation in top management improve firm performance? A panel data investigation. Strategic Management Journal, 33: 1072-1089.

Duchin, R., Matsusaka, J. G., & Ozbas, O. (2010). When are outside directors effective?. Journal of financial economics 96(2), 195-214.

Edelstein, R., Qian, W., & Tsang, D. (2011). How do institutional factors affect international real estate returns?. The Journal of Real Estate Finance and Economics 43(1-2), 130-151.

Easterwood, J. C., Ince, O. S. & Raheja, C. G. (2012). The evolution of board and CEOs following performance declines. Journal of Corporate Finance 18(4), 727-744.

Fahlenbrach, R. Low, A. & Stulz, R. M. (2010). Why do firms appoint CEOs as outside directors?. Journal of Financial Economics 97(1), 12-32.

Faleye, O. (2004). Are large boards poor monitors? Evidence from CEO turnover. Evidence from CEO Turnover. EFMA.

Fich, E. M., & Shivdasani, A. (2006). Are busy boards effective monitors?. The Journal of Finance 61(2), 689-724.

Florackis, C. & Ozkan, A. (2009). Managerial incentives and corporate leverage: Evidence from the United Kingdom. Accounting & Finance 49(3), 531-553.

Fogel, K., Ma, L., & Morck, R. (2014). Powerful independent directors. No. w19809. National Bureau of Economic Research.

Friday, H. S. & Sirmans, G. S. (1998). Board of Director, Monitoring and Firm Value in REITs. Journal of Real Estate Research 16(3), 411-427.

Gillan, S. L. & Starks, L. T. (2003). Corporate Governance, Corporate Ownership, and the Role of Institutional Investors: A Global Perspective.
http://dx.doi.org/10.2139/ssrn.439500.

Gompers, P., Ishii, J., and Metrick, A. (2003). Corporate Governance and Equity Prices. The Quarterly Journal of Economics 118(1), 107-155.

Guest, P. M. (2009). The impact of board size on firm performance: evidence from the UK. The European Journal of Finance 15(4), 385-404.

Han, B. (2006). Insider ownership and firm value: Evidence from Real Estate Investment Trusts. Journal of Real Estate Finance and Economics 32(4), 471-493.

Harjoto, M., Laksmana, I. and Lee, R. (2015). Board Diversity and Corporate Social Responsibility. Journal of Business Ethics 132(4), 641-660.

Hermalin, B. E.,& Weisbach, M. S. (1988). The Determinants of Board Composition. RAND Journal of Economics 19(4), 589–606.

Hermalin, B. E.,& Weisbach, M. S. (1991). The Effects of Board Composition and Direct Incentives on FirmPerformance. Financial Management 20(4), 101–112.

Hermalin, B. E.,& Weisbach, M. S. (1998). Endogenously Chosen Boards of Directors and Their Monitoring of the CEO. American Economic Review 88(1), 96–118.

Hermalin, B. E.,& Weisbach, M. S. (2003). Boards of Directors as an Endogenously Determined Institution: A Survey of the Economic Literature. Economic Policy Review 9(1), 7–26.

Jensen, M.C./Meckling, W. H. (1976), Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure, in: Journal of Financial Economics, Vol. 3, S. 305-360.

Joecks, J., Pull, K. & Vetter, K. (2013). Gender Diversity in the Boardroom and Firm Performance: What exactly constitutes a “critical mass”?. Journal of Business Ethics 118(1), 61-72.

Johnson, S. G., Schnatterly, K. & Hill, A. D. (2013). Board Composition Beyond Independence: Social Capital, Human Capital, and Demographics. Journal of Management 39(1), 232-262.

Joshi, A., Liao, H. & Roh, H. (2011). Bridging domains in workplace demography research: a review and reconceptualization. Journal of Management 37(2), 521-552.

Kohl, N. (2009), Corporate Governance and Market Valuation of Publicly Traded Real Estate Companies – A Theoretical and Empirical Analysis, in: Schulte, K.-W./Bone-Winkel, S. (Edt.): Schriften zur Immobilienökonomie, Band 50, Köln.

Kor, Y. Y. & Sundaramurthy, C. (2009). Experience-based human capital and social capital of outside directors. Journal of Management 35(4), 981-1006.

Krishnan, H. A. & Park, D. 2005. A few good women on top management teams. Journal of Business Research, 58: 1712-1720.

Lipton, M. & Lorsch, J. W. (1992). A modest proposal for improved corporate governance, Business Lawyer 48(1), 59-77.

McDonald, M. L., Westphal, J. D. & Graebner, M. E. (2008). What do they know? The effects of outside director acquisition experience on firm acquisition performance. Strategic Management Journal 29(11), 1155-1177.

Pathan, S. (2009). Strong boards, CEO power and bank risk-taking. Journal of Banking & Finance 33(7), 1340-1350.

Post, C. and Byron, K. (2015). Women on Boards and firm financial performance: A meta-analysis. Academy of Management Journal,

Raskop, J. (2004), Deutscher Corporate Governance Kodex und Kapitalkosten, in: Fehl, U./Oberender, P./Leschke, M./Ulrich, V. (Edt.): Schriften zur Nationalökonomie, Band 42, Bayreuth.

Renders, A., Gaeremynck, A. & Sercu, P. (2010). Corporate Governance Ratings and Company Performance: A Cross European Study. Corporate Governance: An International Review 18(2), 87-106.

Sah, R. & Stiglitz, J. (1986). The architecture of economic systems: hierarchies and polyarchies. American Economic Review 76(4), 716–727.

Sah, R. & Stiglitz, J. 1991. The quality of managers in centralized versus decentralized organizations. Quarterly Journal of Economics 106(1), 289–295.

Schaefers, W./Kohl, N./Schulte, K.-W. (2008), Corporate Governance bei Real Estate Investment Trusts, in: Bone-Winkel, S./Schäfers, W./Schulte, K.-W. (Edt.): Handbuch Real Estate Investment Trusts, Köln, S. 234-249.

Terjesen, S., Couto, E. B., & Francisco, P. M. (2016). Does the presence of independent and female directors impact firm performance? A multi-country study of board diversity. Journal of Management & Governance 20(3), 447-483.

Vafeas, N. (1999). Board meeting frequency and firm performance. The Journal of Financial Economics 53(1), 113-142.

Yermack, D. (1996). Higher market valuation of companies with a small board of directors. Journal of financial economics 40(2), 185-211.

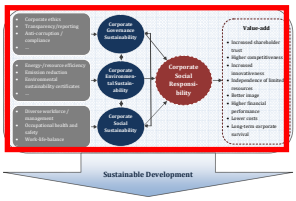
5 Conclusion

Sustainable development is one of the major topics of the past two decades. However, due to its inflationary (mis-)use - since everything and everyone shall be *sustainable* – the resulting wide range of definitions and interpretations led to sustainability being one of the most contested concepts. Different streams of understanding coined this development. On the one hand, consumers, investors or regulators become more and more conscious about fair working conditions, clean product value-chain or environmental protection requiring sustainability. This increasing demand for sustainability in turn increased pressure on the business world to achieve considerable improvements in all – environmental, social and governance – sustainability dimensions. On the other hand, a major part of the business world perceived sustainability as a cost-effective marketing tool. The main answer was being sustainable in peripheral activities while in the background sticking to the old, conservative way of doing core business. For instance, companies started engaging in higher corporate philanthropy but went on exploiting workers in developing countries to push prices down and increase profit margins or accepted having high emissions but lower short-term costs in their core business. Hence, in other words, the external effects of their doing are still not internalized, but rather *greenwashed* by superficial sustainability efforts. One of the main reasons for this gap is that still too little is known about sustainability as a long-term investment and whether it would pay-off on the long run with such advantages like increased customer loyalty, future competitiveness or cost optimization. Hence, sustainability advocates try to promote the link between sustainability and corporate (financial) advantages by emphasizing the view of sustainability as a long-term investment. A closer look at past research in this field reveals that in particular the real estate sector is not duly represented. Especially, considering this sector's vast environmental, social as well as economic effects, it becomes clear, that further research in this field is needed. Hence, this work contributes to these aspirations by means of empirical and theoretical analysis. That is, in three articles comprising the main body of this work it analyzes how companies can generate (financial) advantages by being sustainable. This is undertaken at different company levels. The sustainability data sources from the global reporting initiative (GRI) database and Thomson Reuters Asset4ESG while the financial data is derived from Datastream. The following section

gives an overview of the main findings of the three articles and closes with some further remarks on potential areas for research.

5.1 Executive summary

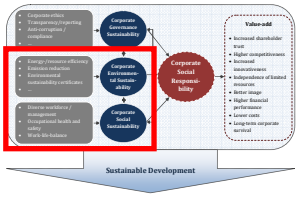
The value contribution of sustainability reporting - an empirical evidence for real estate companies



Ever since corporate reporting was a major part of stakeholder communication. However, in the course of time stakeholders' needs for more information on the sustainability performance of companies increased, but annual reports or other regulatory files failed to satisfy these additional informational desires. Though, sustainability information is provided by some pioneering companies, the problem was that this information was lacking uniformity and thus comparability. As a result, the Global Reporting Initiative (GRI) developed frameworks for sustainability reports in order to ensure this lacking comparability and hence reduce information asymmetries. Also, the fact that each company's sustainability reports are released by GRI ensured credibility and trust for potential investors. The main purpose of this article is to analyze whether the information provided in these sustainability reports are of decision-usefulness and –relevance for investors. Thus, if sustainability disclosure provides information of decision usefulness to investors, higher (lower) sustainability disclosing companies are expected to have relatively higher (lower) abnormal stock returns. As such, by means of event study, the potential impacts of the event *publication of sustainability report* on the share price of the publishing company were analyzed over an event window of 120 days before and after the publication. This is in particular undertaken for a sample of real estate companies due to their specific sustainability responsibilities. Hence, this article is the first to analyze GRI data and the first to focus on the real estate sector. The results of an initial after-minus-before stock index distribution for 227 GRI publications over a time period 1999 till 2015 show that for about 70 % of the observations the index difference is positive. After 106 days, almost 70 % of the publication observations reveal a positive index value between +0.6 and +3.7 %. The main calculation of the abnormal returns cumulated for the sample over the event window confirms the initial descriptive results: 29 days after the release of the sustainability report, the listed real estate companies exhibit a cumulated abnormal return of at least 3 %. 70 days after release the CAR value is at least 1 %. The analysis of

the CAR across the disclosing companies revealed that for 90 % of the companies, the CAR targets at least 2.5 %. However, only 10 % of the sample companies generate a statistical significant CAR of at least 5 %. Combining the analysis over time and across the sample, the t-test reveals a significant CAR of up to 2 % for the whole sample. The implications of this analysis are manifold. For companies bearing the costs of disclosing sustainability reports, it is a confirmation of the expected positive returns. Furthermore, it is also a confirmation of their sustainability focus itself. From the investors' point of view, sustainability reports do contain valuable information about the companies and thus can be anticipated in investment decisions. From the sustainability frameworks providers' view – the GRI – the framework is appreciated by the market participants as well as by the companies. For the whole real estate sector, the results are an incentive that there is demand for more sustainable corporate management. Thus, for non-disclosing real estate companies these results might be a further incentive to start disclosing sustainability information and going along with this – to invest increasingly in sustainability.

Management diversity and superior corporate environmental performance – a global longitudinal analysis with special evidence for the real estate industry



Modern times have pledged for gender equality out of ethically and socially motivated reasons or out of value-increasing effects, diversity is assumed to promote from an economical point of view. However, besides the direct positive financial effects, it is also assumed that gender diverse teams increase the sustainability performance of companies and by this enhance directly and/or indirectly the corporate financial performance. Especially, for sectors with high environmental impact like the real estate and construction industry, it might be a benefit to improve gender diversity and by this the corporate environmental sustainability performance.

However, no matter what argumentation line is chosen to promote gender equality, in practice the threat of tokenism is still prevalent: It results out of superficial gender diversity and equality implementation attempts. Concerning the business world, tokenism takes place on different level. As an answer to widespread legislative regulations requiring higher number of female board directors via quotas, companies started appointing women on the board of directors. However, for the majority of the business world, these attempts ended with having one woman on the board of directors – the *token woman*. In this context, research has proven that minorities fail to promote the positive effects actually intended with diversity. Thus, tokenism takes place. Nonetheless, there are companies with gender parity on board level. But, in fact, having gender parity on board level but no women on key decision-making management positions also results in tokenism. This is the so called *double-tokenism* effect, the basis for this article's argumentation. Therefore, the aim of this work is to analyze the link between environmental sustainability and management diversity besides board level diversity. The reason for this is the assumption that the benefits of gender diversity can only be achieved if diversity is a part of the corporate culture, integrated at all important, decision-making management level. Hence, if empirical evidence can prove the benefits of gender parity on board subordinated management level, than this is the best argument for gender diversity in organizations.

Initial descriptive statistics of various sub-samples show that real estate and construction companies have on average the lowest number of female managers (6.48 %), while the highest percentage of female managers are employed at the financial and

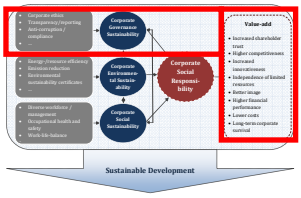
insurance sector (11.08 %). Though, considering that by definition gender parity equals 50 % female managers, all sectors suffer from excessive backlog.

The results for the total sample confirm the positive effects of gender diversity in decision-making management positions on the corporate environmental sustainability performance, i.e. a 10 % increase in female managers results in a 0.6450 % higher total environmental sustainability performance, ceteris paribus. This positive correlation is the highest for the environmental product innovation sub-category (ENPI). Thus, holding other effects constant, a 10 % increase in female manager results in a 1.782 % increase in product innovativeness concerning environment, i.e. female managers predominantly promote the development of eco-efficient products and services, thereby increasing the product innovation abilities of a company. Furthermore, analysis of companies with at least 10 % female managers even reveals that the positive environmental sustainability increasing effects is for the environmental product innovation category about 47 % (1.5 times) higher compared to the total sample. As such, a 10 % increase in female manager results in a 2.62 % increase in the environmental product innovation score, keeping all other effects fixed. For the total sample, the value increase is about 1.78 %, ceteris paribus. In all regressions, the variable board diversity is ought to control for board level diversity. The results show consistently that management diversity has a higher impact compared to board level diversity, further confirming the assumption of tokenism on board level.

Concerning sub-sample analysis, in particular, the real estate and construction sector is suspected to have devastating strong effects on the environment. Thus, the special focus of the second part of the analysis is the examination of the correlations for this sector. The results indicate that gender diversity in decision-making management level has even higher positive impacts for real estate and construction companies compared to the total sample. For instance, a 10 % increase in women on management positions results in a 1.44 % increase in the overall environmental sustainability score. Hence, compared to the total sample, real estate companies have 2.23 times higher effect of gender diversity in decision-making positions, though this result is not significant at common significant level. However, the highest and most significant effect of gender diversity on management level can be reached for the environmental emission reduction score, ENER. For real estate companies, a 10 % increase in female managers results in a 1.638 % increase in the environmental emission reduction sub-score, ceteris paribus.

Various robustness tests are conducted to examine whether the results hold under different conditions. In an initial step, the correlation between employee diversity as a proxy for management diversity with environmental performance is performed. The results confirm the initial values for Envscore as well as vor ENPI. Also, the analysis of a non-financial sub-sample and the geographical region of developed European countries confirm the majority of the results. Thus, in practice, companies in general can benefit from gender parity on management level, since it increases environmental sustainability performance, which in turn is expected to increase financial performance indirectly.

Determinants of board of directors and corporate performance with special evidence for the real estate industry



The principles of responsible corporate management and control, and the optimal implementation thereof have always been important for research and practice. Considering the corporate failures and scandals of the past decades (e.g. Lehman Brothers, Enron, Volkswagen AG), corporate governance seems to be more topical than ever. As a cornerstone of the three sustainability dimensions – social, environment and governance - a large bulk of research has been dedicated to the possible implications of variations in corporate governance. In this context, the board of directors as an internal governance mechanism to control and manage the company in the best interests of the shareholders has involved scholars intensely. However, research results on the best combination and design of the board of directors to increase corporate financial performance has still been ambiguous. Hence, by extending previous research to the following new dimensions, this article's objective is to close research gaps and obtain valuable insights for the practice. As such, the focus has been on the usage of raw level data instead of the common dichotomous or ratio approach in governance research to determine the performance implications of a set of four board attributes which are in particular the size of the board, the annual frequency of board meetings and the percentage of non-executive and independent board members. The results of the ordinary least squares regression analysis with panel data comprising a period of 13 years reveal interesting insights into corporate governance needs of different sectors and companies. The examination of the correlation between board of directors attributes and corporate financial performance measured by Tobin's Q – reflecting the market-based financial performance – show that board size is negatively correlated with financial performance. This result holds for all company types, all sectors, geographical regions as well as company sizes and confirms the results of previous research (e.g. Yermack, 1996). When it comes to the other attributes – board meeting frequency, percentage of non-executive and independent board members – the results indicate that there is no *one* "governance concept" fitting all companies in all sectors to result in positive financial performance. In fact, the results vary with regard to the chosen sub-sample. Hence, concerning the analysis of different sub-samples, the results show that the utilities & consumer goods sector has the least sensitivity to changes in the board of directors. Besides the inverse effect of board size, neither the board meeting frequency,

nor the percentage of non-executive and independent board members has a significant effect. In contrast to this, the technology and industrial sector are significantly affected by changes in these board characteristics. Besides board size effects that are for all sub-samples similar, technology companies benefit financially, when the percentage of independent board members increases and that of non-executive board members decreases. The meeting frequency is irrelevant to financial performance. The real estate and construction sector is placed the second when it comes to financial sensitivity to board room changes. Besides board size, only the percentage of independent board members has a negative significant impact on Tobin's Q. In contrast to this, for industrial companies there is a significant positive link between board meeting frequency and percentage of non-executive directors. Also, the independence of directors has no financial implications for industrial sector due to insignificance. A possible explanation for this divergence might root in the varying degrees of external control exercised by governmental regulations, consumer protection laws or capital markets. However, sector-specific results provide evidence for sector-individual governance needs. The analysis of different company size confirms the assumption: There is no one governance concept fitting all companies. The results show that smaller companies are more sensitive to board of director characteristics than large companies, i.e. all four board characteristics have significant impact on Tobin's Q. A possible explanation is that external control (financial markets, governmental regulations, investors' desires, public pressure etc.) are higher for large companies. Practical implications of these results are that companies need to specifically consider the corporate environment before deciding to make any changes to the board of directors, since there is no one board concept fitting all. This also holds for the real estate and construction sector largely assumed as an industry with high governance needs.

5.2 Final remarks and further research

"Change can happen if we all live like we'd like the change."

- Al Gore -

Increasing global temperatures, melting ice caps, floods, draughts, natural resource scarcity and pollution, exploitation of the poor and speechless for the higher comfort of the rich and developed, growing gap between poor and rich, global financial crises, employee exploitation etc. – the list seems to be endless and indicates the current generations' inheritance for future mankind. Though, this might sound trite, but fact is: the world is desperate for change since a business as usual is more inappropriate and dangerous than ever. Thus, it is no surprise that sustainable development is one of the major challenges of this century. As corporations are identified as one of the main contributors to the aforementioned developments, in particular, Corporate Social Responsibility – the business worlds' contribution to sustainable development – is in the center of awareness. But sustainability cannot work without the will for change: This means the pursuit for change in the way of doing business, i.e. the change in the way of thinking towards a more environmental and social consciousness, instead of short-term "*dash for cash*" economic solutions.

In other words, it is important for corporations to change the still widely prevalent thinking that sustainability is a marketing tool, something you pretend to be committed to in order to gain customer trust and governmental license to operate. Hence, in order to trigger deliberate change, we need proof. Underpinning empirical research might shed some light in the long-term direct and indirect financial benefits of the conscious way of doing business. As altruism is no choice, what can be a larger incentive than financial benefits of sustainability? Therefore, this work's aim is to address the financial benefits of sustainability beyond '*greenwashing'*, i.e. sustainability implemented in the core business. Hence, the direct and indirect financial implications of different aspects of Corporate Social Responsibility are examined in three articles. The results could show for parts of this huge topic that all three dimensions of sustainability – environmental, social and governance – can generate positive outcomes for the business world. So, the question whether sustainability does pay-off, can be affirmed as a consequence of this work's results.

Nonetheless, as for any other empirical research, the restricted simplification and exemplariness of reality modeling always entails distortions. Thus, this research might be a beginning point for further work in this field. Since, the Asset4ESG database provides sophisticated and comprehensive data on corporate sustainability; it can be used to further explore the impacts of corporate environmental and social sustainability on corporate risk, measured, for example, as the standard deviations of stock returns. Furthermore, another interesting approach would be the merger of different sustainability ratings to gain a holistic and far-reaching rating and consequently, in depth results on implications of corporate sustainability performance. Also, an aspect of interest would be the explicit data gathering on decision-making management positions besides the board level. This is still a neglected area with large shortcomings concerning various important value-driving characteristics such as age, work experience or education. Also, it would be interesting to analyze the effects of gender diversity, environmental sustainability and corporate governance on future corporate performance, i.e. a forward-oriented research approach.

All in all, change can only take place and initiate progress, if it finds true supporters who act accordingly. Especially, corporate practice needs to take empirical results on the benefits of sustainability seriously and trigger change towards a more sustainable and conscious business-making in the organization. In this context, leaders in all decision-making positions can be a role model for the wanted positive change. In the long-term, this is maybe the only way how current generations could pave the way for future mankind.