

**Bachelor's Thesis for the Attainment of the Degree
Bachelor of Science at the TUM School of Management of
the Technische Universität München**

Title:

New Draft of the German Corporate Governance Code:
Are German Supervisory Boards Prepared for More
Sustainability?

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Submitted on: 09.06.2022

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ABSTRACT

The aim of this thesis is to examine the amount of sustainability experience in supervisory boards of listed German companies. I do this by examining 78 supervisory boards of German listed companies on the DAX and MDAX stock market indexes. I use CV and annual report research to collect data. I find that the majority of supervisory boards do not have sustainability experience. In additional analyses, I find that there are several structural approaches supervisory board take to address sustainability, however, some can be considered “green washing” attempts. Moreover, I provide evidence that companies with strong brand awareness or companies in environmentally sensitive industries are more likely to have sustainability experience in their supervisory board. In addition, I find that supervisory board members with sustainability experience are more likely to be female than male, more likely to be international, and most commonly have a finance or innovation functional background.

Keywords: Sustainability, Sustainable Corporate Governance, German Corporate Governance Code (GCGC), ESG, CSR.

I. INTRODUCTION

Corporate sustainability and sustainable corporate governance have become issues of increasing importance for German companies over the last years. In December 2019 the president of the European Commission Ursula von der Leyen presented the European Green Deal, an initiative to make the European economy carbon neutral by 2050. In her words this would be the basis for future legislation (European Commission, 2019). In February 2022 the commission adopted a proposal for a directive on “Corporate Sustainability Due Diligence” with the aim of “*foster[ing] sustainable and responsible corporate behavior and to anchor human rights and environmental considerations in companies’ operations and corporate governance*” (European Commission, 2022). On the German national level, in January 2022 the government commission for the German Corporate Governance Code (Regierungskommission Deutscher Corporate Governance Kodex) published the latest draft of the code with a heavy focus on integrating sustainability in the corporate governance (Schaffner, 2022). Prior literature has shown that sustainable corporate governance can have benefits for companies. For example, it can increase brand performance and brand equity (Cowan & Guzman, 2020), increase share price (Robinson et al., 2011), improve financial performance (Wiengarten et al., 2017) and innovation performance (Zhang et al., 2020). As no research has been done yet assess how prepared German listed companies are for the new proposed changes to the GCGC, this will be the focus of this thesis.

In 2002 the commission published the first version of the German Corporate Governance Code (GCGC). Since the first version of the GCGC was released, it has undergone 12 changes and amendments. Each amendment is intended to reflect current world trends and the developments in the discussion around corporate governance. In January 2022 the latest draft of the GCGC was published. This draft of the code shows a strong emphasis on sustainable development and sustainable corporate governance (Schaffner, 2022). In particular, a new recommendation to include sustainability experience into the competence profile of the supervisory board. To the best of my knowledge, no research has been conducted on the extent of sustainability experience in German supervisory boards.

Prior research has shown that top management teams claimed already a decade ago that they were aware that sustainability was important for future company success (Kocmanová et al., 2011). However, there was confusion about what sustainability is and how it relates to corporate governance (Aras & Crowther, 2008). Nevertheless, the passing of the EU directive on non-financial reporting and its implementation in German law could have led to an increase of sustainability experience in German supervisory boards.

From a supervisory board structural perspective, supervisory boards have several tools at their disposal. For example, supervisory boards are free to establish committees to address issues at the corporate governance level. Such a committee could be established to address sustainability issues. Supervisory boards could also nominate new members with sustainability experience. However, Peters et al. (2019) has shown that companies can hire executives with a pretense for having experience in sustainability, without actually being committed to sustainability initiatives. This leads me to believe that some of the structural approaches that supervisory boards implement will not be genuine attempts at increasing their knowledge in sustainability.

From an industry perspective, companies that are more active in B2C markets could have more sustainable experience in their supervisory boards, as they might incur significant reputational damage and reduction to brand equity if customers see them as uncommitted to sustainability (Cowan & Guzman, 2020). Likewise, companies in sensitive industries are more likely to already have sustainability experience in the supervisory board because they are under public scrutiny and integrating sustainability into the corporate management can send a signal that the company is committed to sustainability issues (Peters et al., 2019).

From an individual board member perspective, I am not aware of research that investigated the characteristics of supervisory board members with sustainability experience. Hence, I construct an average profile of such members. In particular, I expect the gender of the supervisory board member to be a significant factor, as prior literature has shown that women are more likely to act ethically (Mason & Mudrack, 1996) and are more interested in sustainability (Imbulana Arachchi & Managi, 2021). Moreover, research on gender diverse boards of directors has shown women are better at implementing sustainable and environmentally friendly policies (Glass et al., 2016; Kassinis et al., 2016).

To analyze the amount of sustainability experience in German supervisory boards, my final sample consists of 38 companies in the DAX and 40 companies in the MDAX¹ with 925 supervisory board members in total. I follow Peters et al. (2019) and collect information by examining the annual reports² of the company and the curriculum vitae (CV) of its supervisory board members. For each supervisory board I collect data on its board members and the board itself. With respect to the supervisory board members, I collect data on the following variables: *Sustainability Experience*, *International*, *Gender*, *PhD*, *Committees*, *Employee Representative*, *Age*, and *Tenure*. To measure sustainability experience, I follow

¹ The small sample size is due to the time restriction of a bachelor thesis.

² These are mostly of the fiscal year 2021, but as I began collecting data in early 2021, some companies did not publish the annual report for 2021 yet. In these cases I used the annual report for the fiscal year 2020.

Wiengarten et al. (2017) and treat sustainability as an umbrella term. Following this logic, I follow Peters et al. (2019) and determine if a member has sustainability experience by looking at their CV for an array of keywords in the previous positions titles or listed past experience. With respect to the supervisory board itself, I collect data on the following variables: *Sustainability Experience, Board Size, Structural Approach, and Industry*.

Overall, I find that the majority of supervisory boards in the sample don't have sustainability experience, with only 36 out of 78 supervisory boards having sustainability experience. Furthermore, I find that the stock market index has an effect on sustainability experience in the supervisory board. When controlling for the index I find that the MDAX companies are the driver of the lack of sustainability experience in the general sample, as a majority of 26 out of 38 DAX companies have sustainability experience, in contrast to a minority of 10 out of 40 MDAX companies.

Taking the supervisory board structural perspective, I find five different structural approaches supervisory boards in the sample have implemented to address the demand for sustainability experience. The most common approach is establishing a sustainability committee to address sustainability issues. I determine that this approach is a new phenomenon that started two years ago. There are signals that suggest that some supervisory boards establish a sustainability committee not as a genuine attempt to increase sustainability experience and knowledge. For example, 5/11 sustainability committees were named differently in the past and were simply rebranded without any change to the members. Additionally, one third of sustainability committees in the sample don't have any members with sustainability experience on them. The second most common structural approach is false branding of existing board members as sustainability experts. Another approach is to nominate a new member with sustainability experience or find existing board members with sustainability experience. I notice that the supervisory boards in the sample prefer to look within their own ranks for sustainability experience, rather than recruit a new member. A further approach is to delegate the responsibility for sustainability issues to an existing committee. In all four instances in the sample the audit committee is the one that receives this responsibility. The final approach is to conduct training or workshops on sustainability topics. Surprisingly, this is the least used approach.

Taking the industry perspective, I categorize the 78 companies into 26 industries using the Fama/ French industry categorization. I discover that there is a majority of companies with sustainability in their supervisory board in the industries "Automobiles and Trucks",

“Utilities”, “Consumer Goods”, “Apparel”, “Retail”, and “Construction Materials”, “Insurance”, “Food Products”, “Electronic Equipment” and “Aircraft”.

Finally, taking the individual supervisory board member perspective, I compare supervisory board members with sustainability experience with their peers, on several characteristics. I find that board members with sustainability experience are more likely to be female and international. Likewise, by analyzing the committee participation of board members with sustainability experience, I find that supervisory board members with sustainability experience most commonly have a finance or an innovation functional background.

My study makes several contributions to the literature. First, I contribute to the literature on the German Corporate Governance Codex. Research on the GCGC has mostly focused on the effects on companies following the code (Bollmann, 2007; Kaspereit et al., 2017; Kaspereit et al., 2015; Langer, 2017). Likewise, there have been articles discussing the new recommendations set in the latest draft of the code (Masons, 2022; Schaffner, 2022), however, these merely discussed the changes made. To the best of my knowledge my study is the first one to investigate if supervisory boards are able to comply with these new recommendations.

Second, my study complements the literature on board diversity in the context of sustainable corporate governance. Prior research has shown that board diversity, in particular gender diversity, has an effect on the integration of sustainability into the corporate governance and on the implementation of environmentally friendly strategies (Dienes & Velte, 2016; Glass et al., 2016; Kassinis et al., 2016). This notion that women are leading sustainability in corporate governance is supported by my finding that supervisory board members with sustainability experience are more likely to be female.

Finally, my study adds to the research done by Dienes & Velte (2016), who have investigated supervisory board composition in Germany, by adding knowledge on their sustainability expertise.

The remainder of this thesis is organized as follows. Section 2 describes the GCGC and its latest draft. Section 3 discusses the research questions. Section 4 presents the data and methodology. Section 5 presents the descriptive results and the three analysis perspectives and their results. Section 6 concludes.

II. THEORETICAL BACKGROUND

The German Corporate Governance Code (GCGC)

The topic of responsible corporate governance became a relevant one in Germany already in the 1990s (Strieder, 2005). Shortly after the large German building company Philipp-Holzmann filed for bankruptcy, the German government, at the time lead by chancellor Gerhard Schröder, ordered in May 2000 to form a government commission to investigate and come up with recommendations to address mismanagement and maladministration in German listed companies (Müller-Michaels, 2012). The commission's recommendation was to address the lack of guidelines with an appropriate corporate governance code (Baums, 2001).

In September 2001 a government commission, now known as the “Government Commission for the German Corporate Governance Code” (Regierungskommission Deutscher Corporate Governance Kodex), was formed to create such a corporate governance code. Although it was created by a government body, namely the Federal Ministry of Justice, it does not consist of any representatives of political parties and does not follow the instructions of the government. Instead, the members that comprise the commission are members of management and supervisory boards of listed German firms (Regierungskommission, 2022). Thus, the commission was formed with the intent to serve the business sphere and allow a form of self governance (Regierungskommission, 2014).

The commission published its first draft of the German Corporate Governance Code (Deutscher Corporate Governance Kodex) on the 26th of February 2002 (Müller-Michaels, 2012). The goal of the code was to set guidelines and recommendations for corporate governance, namely for the management board and the supervisory board of German listed companies, in order to increase transparency and trust in German firms and the German capital market in general, in particular among foreign investors, who are less familiar with the two tier corporate governance system (Regierungskommission, 2014). The code is divided into three types of guidelines: principles, recommendations, and suggestions. German listed companies are only legally required to follow principals, which represent legal requirements. Even though they are not legally required to follow the recommendations and suggestions, they have to follow the so-called “Comply or Explain” rule. Pursuant to §161 of the Stock Corporate Act (AktG) the companies need to publish a statement of conformity to the GCGC and any deviations from recommendations set by the GCGC need to be explained. This makes the GCGC a form of “soft law” (Koch, 2022). The first complete version of the GCGC was finally published online on 20th of August 2002.

Since then, the commission meets yearly to review the code and to make amendments. These are intended to reflect current world trends and the developments in the discussion

around corporate governance. Since 2011 the commission has ensured that anyone interested can contribute to the development of the code, by introducing a consultation phase. After the commission has agreed on proposed changes to the code, a draft of the code is published and the consultation phase begins. In this phase the commission receives feedback from the general public and takes it into account before publishing a final version. Over the two decades of its existence, the GCGC has undergone 12 changes and amendments. These dealt with, among others, ensuring diversity in the supervisory and the management boards, in particular the inclusion of more female members; ensuring the independence of board members and increasing transparency related to their affiliations; setting concrete criteria for board member compensation; setting guidelines for the competence portfolio of the supervisory board, etc.

2022 Draft of the GCGC

On the 21st of January 2022 a draft of the new version of the GCGG was published by the commission and the consultation phase began. This draft of the code shows that a strong emphasis has been put by the commission on sustainable development and the incorporation of sustainability related topics into corporate governance (Schaffner, 2022).

In particular, the supervisory board is called to consider sustainability in its own work supervising the management board. Namely, recommendation A.6 calls for the supervisory board to pay attention that *“environmental and social sustainability is taken into account in the strategic orientation of the company and its implementation”* and that *“strategic and operational plans include financial and sustainability-related objectives, [and] that the internal control and risk management system is also aligned with sustainability-related concerns”* (Regierungskommission, 2022). To be able to comply with this recommendation, and ultimately supervise and evaluate the board of management’s implementation of sustainability policies, knowledge in sustainability is required. Thus, recommendation C.1 states that *“the Supervisory Board’s skills and expertise profile shall also comprise expertise regarding sustainability issues relevant for the enterprise.”* (Regierungskommission, 2022). This recommendation has a direct implication for the composition of the supervisory board and future recruitments to the board. More precisely it implies that at least some members of the supervisory board need to have some past experience with sustainability issues.

Furthermore, recommendation D.4 explicitly mentions the audit committee and states that the chair of the audit committee should now have *“specific knowledge and experience in applying accounting principles, in sustainability reporting and risk management*

systems,...including the assurance of sustainability reporting.” (Regierungskommission, 2022).

In addition, the new draft adds to the tasks of the supervisory board to also monitor that sustainability issues are considered in the corporate strategy and in the internal control and risk management systems (Regierungskommission, 2022).

III. RESEARCH QUESTIONS

To investigate sustainability experience in German supervisory boards, I take several perspectives. I take a supervisory board structural perspective and investigate structural approaches that supervisory boards could implement to increase or add sustainability experience. I take an industry perspective and examine if the industry a company is active in has an effect on sustainability experience in the supervisory board. I take an individual board member perspective and examine how many supervisory board members have sustainability experience and what are their characteristics.

Before I look at each perspective separately, I conduct a general analysis and establish an overview. This overview should show to what extent supervisory boards already have sustainability experience. Prior research has shown that top management teams claimed already a decade ago that they were aware that sustainability was important for future company success (Kocmanová et al., 2011). However, when asked about sustainability’s direct relationship to corporate governance most executives at the time couldn’t give a concrete answer (Aras & Crowther, 2008). This indicates that the term “sustainability” was mostly used as a buzzword and paid lip service to, without integrating it into corporate strategy and management (Krechovská & Procházková, 2014). This suggests that, at the time, sustainability experience was likely not prevalent in German supervisory boards³. However, in 2014 the EU passed the non-financial reporting directive (Directive 2014/95/EU) obligating large undertakings to do reporting on ESG (Environmental, Social and Governance) and sustainability topics (European Commission, 2014), and in 2017 the directive was implemented into German law (Bundestag, 2017). This could have pushed German supervisory boards to acquired sustainability experience to comply with this new legislation.

Question 1: How many German listed companies have sustainability experience in their supervisory board?

³ Unfortunately, most of the research about sustainable corporate governance is relatively old (2014-2017) (Naciti et al., 2021) and does not address German supervisory boards. This leaves me the only option of extrapolating from these findings to the German supervisory boards.

Taking the supervisory board structural perspective, I investigate what structural approaches supervisory boards use to acquire or increase sustainability experience. Supervisory boards that lack sustainability experience could use these approaches as templates and implement them in their own organization. Likewise, I examine if these approaches are genuine attempts to address sustainability issues or are a facade used to avoid public scrutiny. Supervisory boards have several tools at their disposal. For example, supervisory boards are free to establish committees to address issues at the corporate governance level. Such a committee could be established to address sustainability issues. Another approach could be to recruit executives with the necessary experience. However, Peters et al. (2019) has shown that companies can hire executives with sustainability experience in sustainability, without actually being committed to sustainability initiatives. It follows that some of these approaches could be just a form of “ceremonial conformity” to demands from the company.

Question 2: What structural approaches do companies use to address the need for sustainability experience?

Taking the industry perspective, I examine if the industry a company is active in has an effect on the existence of sustainability experience in its supervisory board. One way an industry can affect sustainability efforts on the company's corporate governance level in general, and sustainability experience in its supervisory board in particular, could be the level of exposure to the public. A customer's misbelief in a company's commitment to sustainability efforts could lead to lower brand performance and brand equity (Cowan & Guzman, 2020). This can lead companies that are focused on B2C transactions and are, therefore, more exposed to the public's eye, to be more concerned in preventing reputational damage and protecting their brand. Companies in environmentally sensitive industries could also be rely to integrate sustainability into their corporate governance. By being doing that, such companies can send a signal to customers that the company is committed to sustainability. Moreover, Peters et al. (2019) and Garcia et al. (2017) have shown that companies in sensitive industries have better ESG performance. This also indicates that supervisory boards of companies in sensitive industries may be more likely to already have sustainability experience in the supervisory board because they are aware they are under public scrutiny and therefore put more emphasis on sustainability at the corporate governance level.

Question 3: How does sustainability experience differ by the industry a company is active in?

Taking the individual board member perspective, I examine the characteristics of supervisory board members with sustainability experience and determine an average profile of such members. My literature review does not reveal any previous research about the personal characteristics of executives with sustainability experience⁴, hence, this could be the first examination of this kind in the context of German supervisory boards.

Question 4: *What is the average profile of a supervisory board member with sustainability experience?*

IV. METHODOLOGY

In my initial sample includes 40 companies included in the DAX index⁵ and the 40 largest companies by market capitalization in the MDAX index⁶. As the focus of this thesis is German companies, I exclude supervisory boards of companies that have been established outside of Germany. As some board members hold positions in several supervisory boards, I make sure to consider each individual board member only once. This leads me to a final sample of 38 companies in the DAX and 40 companies in the MDAX⁷ with 925 supervisory board members in total.

For each supervisory board I collect data on its board members and the board itself. With respect to information on supervisory board members, I follow Peters et al. (2019) and collect information by examining the annual report⁸ and the curriculum vitae (CV) of the supervisory board members. Both are available on the company's official website in the "Investor Relations" section. With respect to the supervisory board members, I collect data on the following variables: *Sustainability Experience*, *International*, *Gender*, *PhD*, *Committees*, *Employee Representative*, *Age*, and *Tenure*.

Sustainability Experience is a binary variable. It is the most important variable of interest, as it will answer the research questions of this thesis. "Sustainability" is a broad term and can be defined in many different ways (Moore et al., 2017). Hence, companies are free to interpret its meaning independently, which can lead to different definitions that don't apply across the sample. To avoid choosing one single definition and keeping the criteria broad, I follow Wiengarten et al. (2017) and treat sustainability as an umbrella term. Following this logic, I follow Peters et al. (2019) and determine if a member has sustainability experience by

⁴ Research has been conducted on personality traits, but not on hard characteristics like gender and functional background.

⁵ As of 25.02.2022.

⁶ As of 08.04.2022

⁷ The small sample size is due to the time restriction of a bachelor thesis.

⁸ These are mostly of the fiscal year 2021, but as I began collecting data in early 2021, some companies did not publish the annual report for 2021 yet. In these cases, I used the annual report for the fiscal year 2020.

looking at their CV for an array of keywords in the previous positions titles or listed past experience. In my analysis, I don't look for a particular level of experience (for example, C-level only). Instead, I consider any information displayed on the CV of the respective supervisory board member to be relevant for the performance of their role. Similar to Peters et al. (2019), the array of keywords I use are: "sustainability", "Environmental, Social, and Governance (ESG)", "Corporate Social Responsibility (CSR)", and "environment". As during data collection I notice that some companies omit sustainability related titles in their supervisory board members' CVs. This leads me to consider a secondary array of keywords which prompt a complementary online investigation⁹ of the respective supervisory board members. This second array is based on recurring patterns I notice during data collection. In particular I notice that the keywords "safety", "human resources (HR)" and "energy" are likely to indicate sustainability experience. Hence, I use these words as my secondary array. If the online investigation reveals previous titles, responsibilities or awards that include one of the keywords from the primary keywords, I determine that the board member has sustainability experience. An example of a CV of a supervisory board member with sustainability can be seen in Appendix 1.

International is a binary variable. I define board members as "international" if they have a non-German nationality. As German listed companies can recruit candidates for the supervisory board from outside of Germany, it could be that they use this opportunity to leverage sustainability experience in other countries. Hence, I note the nationality of each board member to determine what proportion of board members with sustainability experience are German. The nationality of the board members is stated in the CV of the board members. If it is not stated, I conclude the nationality by searching for the board member's name online.

Gender is a binary variable. Previous research has shown that gender has an effect on the likelihood to be concerned with ethics and sustainability. Women in particular are more likely to act ethically (Betz et al., 1989) and are more interested in environmental sustainability than men (Imbulana Arachchi & Managi, 2021). Likewise, boards of directors that are more gender diverse have been shown to be more successful at pursuing environmentally friendly policies (Glass et al., 2016). Following this, women board members could be more likely to have sustainability experience than their male counterparts. As the gender of the supervisory board is not explicitly stated, I determine the gender of the board member by either the pronouns used in the CV, a profile photo (if provided) or by an online search.

⁹ As part of the online investigation, I primarily search for the board member's name in Google, LinkedIn, and Xing.

PhD is a binary variable. It conveys if the respective board member has obtained a PhD or not. If board members with sustainability experience are disproportionately more likely to have obtained a PhD, this can indicate that sustainability knowledge in the corporate governance level comes from academia. I determine if the respective board member has a PhD by examining the educational background section in the respective board member's CV¹⁰.

Tenure is a numeric variable. It refers to the number of years a board member has held his position on the board. Data on the tenure of the board members allows me to determine how long the supervisory board has had sustainability experience. This can be revealing about the point in time the company decided to integrate sustainability knowledge into their corporate governance. To measure the tenure, I consider the year on which the board member was first elected as the start of their tenure. If the board member has not held the position consecutively, I consider the year they started holding the position consecutively as the start of their tenure. I deduct the respective year from 2022 to arrive at the measurement.

Committees is a list of supervisory board committees the respective board member is part of. An analysis of the committee participation can provide insight into the functional experience and background of members with sustainability experience. For example, if sustainability members are prevalent in finance committees, this can indicate that members with sustainability experience also have experience in finance. I get the committee participation from the annual report of the supervisory board.

Employee Representative is a binary variable that conveys if a board member is an employee representative or not¹¹. By establishing the number of sustainability experts among the employee representatives, I will be able to determine the scope of sustainability experience in the work councils.

Age is a numeric variable. A difference in age between board members with and without sustainability experience could indicate that sustainability experience is more likely to be found in some age groups. I suspect that younger supervisory board members will be more likely to have sustainability experience, as younger generations have shown to be more interested in sustainability issues (Yamane & Kaneko, 2021). The age of the board members is usually not explicitly stated, only the year of birth is. Hence, I determine the age by deducting the year of birth, as stated in the CV, from 2022.

With respect to the information on the companies, I collect data on the following variables: *Sustainability Experience*, *Board Size*, *Structural Approach*, and *Industry*.

¹⁰ I consider medical doctors as having a PhD as well.

¹¹ All negative instances are shareholder representatives.

Sustainability Experience is a binary variable. It refers to existing sustainability experience in the supervisory board. I define that the supervisory board has sustainability experience if at least one of its members has sustainability experience.

Board Size indicates the number of members on the supervisory board. The size of the supervisory board can be used as a proxy to the size of the firm, as bigger companies tend to have larger supervisory boards (Lakatos, 2020). By comparing the size of supervisory boards with and without sustainability experience, I will be able to determine if the size of the company can be an indicator to sustainability experience in the supervisory board.

Structural Approach refers to a change to the structure of the supervisory board - mostly through a change in the organizational structure or new nominations - or an introduction of new processes meant to increase the competence of the supervisory board in sustainability. To determine this, I examine the latest annual report and older ones for evidence of structural changes in the supervisory board. In addition to that, I search the web for news of future new nominations to the supervisory board and check if the nominee has sustainability experience. Lastly, I search the annual reports for any mention of sustainability related activities in the scope of the supervisory board.

Industry refers to the industry the company is active in. To determine the industry, I use four digit SIC codes and their descriptions¹². I examine the company's product portfolio as it is presented on the company's website and find a definition that matches it best. Lastly, I define the industry with that SIC code's title.

Table 1 presents the descriptive statistics of the binary variables and Table 2 presents the descriptive statistics of numerical variables. Any information I am not able to determine from an annual report, a CV or an online search I leave as blank. This is true for all variables.

¹² Available on: <https://siccode.com/> (Retrieved May 2022)

Variable			Total
	<u>Male</u>	<u>Female</u>	
<i>Gender</i>	614	311	925
	<u>Yes</u>	<u>No</u>	
<i>International</i>	197	715	912
<i>PhD</i>	236	681	917
<i>Employee Representative</i>	388	527	915
<i>Sustainability Experience - Board members</i>	47	870	917
<i>Sustainability Experience - Companies</i>	36	42	78

Table 1 - Descriptive statistics of binary variables

Variable	Observations	Min	Lower quantile	Median	Mean	Upper quantile	Max	SD
<i>Age</i>	906	30	53	58	58.01	63	88	8.5785
<i>Board Size</i>	78	3	7.5	12	12.82	17.75	20	5.4719

Table 2 - Descriptive statistics of numerical variables

V. RESULTS

1. Amount of Sustainability Experience

I start my analysis by providing an overview of the number of supervisory boards in the sample that have sustainability experience. Figure 1 shows that a majority of supervisory boards in the sample do not have sustainability experience, with only 36 out of 78 supervisory boards having sustainability experience.

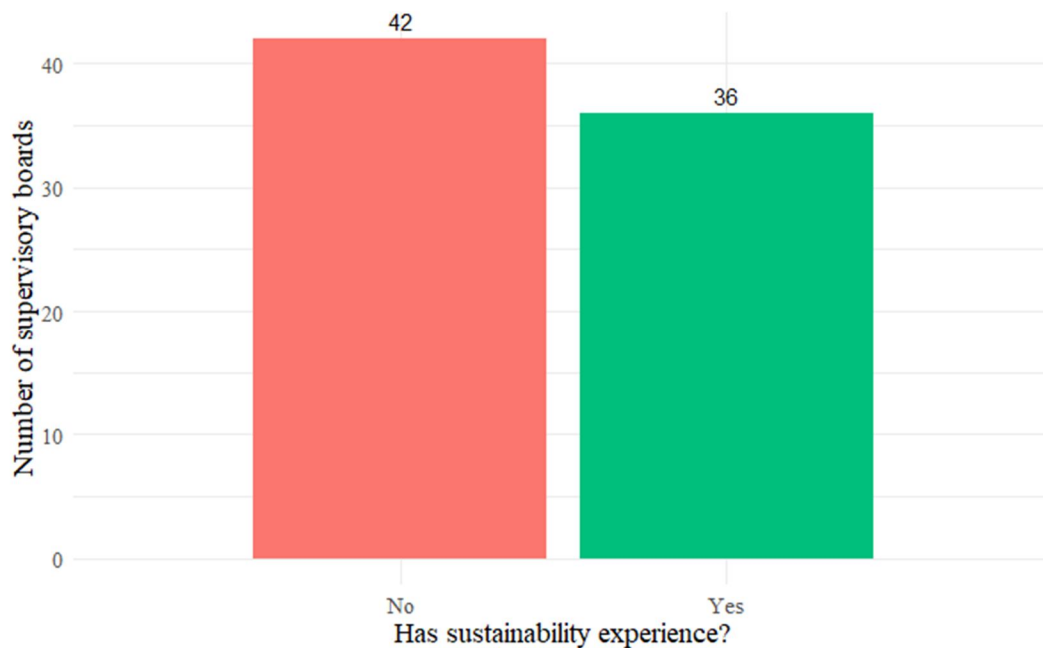


Figure 1 - Most supervisory boards in the sample don't have sustainability experience

Next, I control for the stock market index, and look at DAX companies separately from MDAX companies. Figure 2 shows that a majority of 26 out of 39 DAX companies have sustainability experience. However, most MDAX companies don't have sustainability experience with only 10 out of 40 companies having sustainability experience. This reveals that the driver of the lack of sustainability experience in the general sample is the MDAX companies.

This finding is surprising, as on its face the difference between companies included in the DAX index and the MDAX index is not that large. Both consist of very large companies and it's common that a company moves from one index to the other. A possible explanation to this disparity could be the status that comes with being a DAX company. Following the Wirecard scandal in 2020, a public outcry ensued and investors demanded reforms to the index rules and a reimagining of what a DAX company should stand for (Brühl, 2020). This

led Qontigo, the operator of the DAX index, to start a market consultation to receive feedback from the public (Deutsche Börse, 2020b). The feedback they received included suggestions to consider ESG metrics in the selection of DAX members (Deutsche Börse, 2020a). Although Qontigo did not implement those suggestions in the reformed index rules, this sent a clear sign to the large German companies that sustainability plays a larger and larger role for investors (Brühl, 2020). It could be that DAX members are responding to these signals and integrating sustainability into their corporate governance as a preventative measure in case ESG and sustainability become a requirement for them to stay in the index in the future.

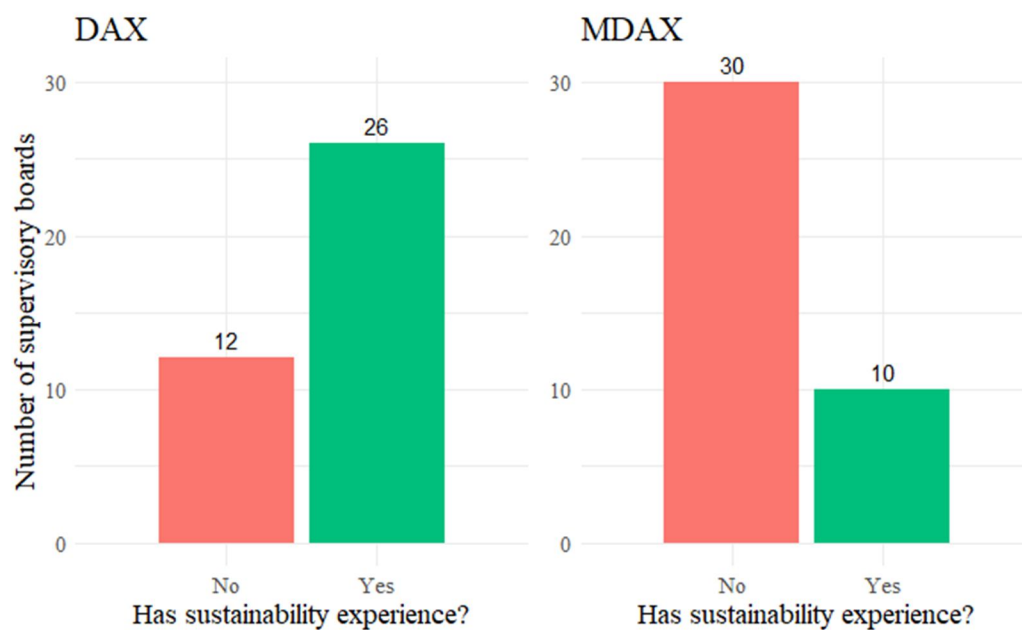


Figure 2 - Supervisory boards of companies in the MDAX are driving the lack of sustainability experience in the general sample

2. Structural Approaches

Next, I take the supervisory board structural perspective and examine what structural approaches supervisory boards use to acquire or increase sustainability experience. I find that there are five distinct structural approaches that supervisory boards in the sample have implemented to address the demand for sustainability experience. Figure 3 shows that the most common structural approach is establishing a sustainability committee to address sustainability issues. The second most common approach is to brand existing board members as having sustainability experience when they don't. I call this approach "Alleged experts". The third approach is to recruit a new board member with sustainability experience or to find presiding board members with sustainability experience, I call this approach "Sustainability Expert". The fourth approach is to delegate the responsibility for addressing sustainability

issues to an existing committee, usually the audit committee. The last approach is for the supervisory board members to participate in training or workshops on sustainability topics.

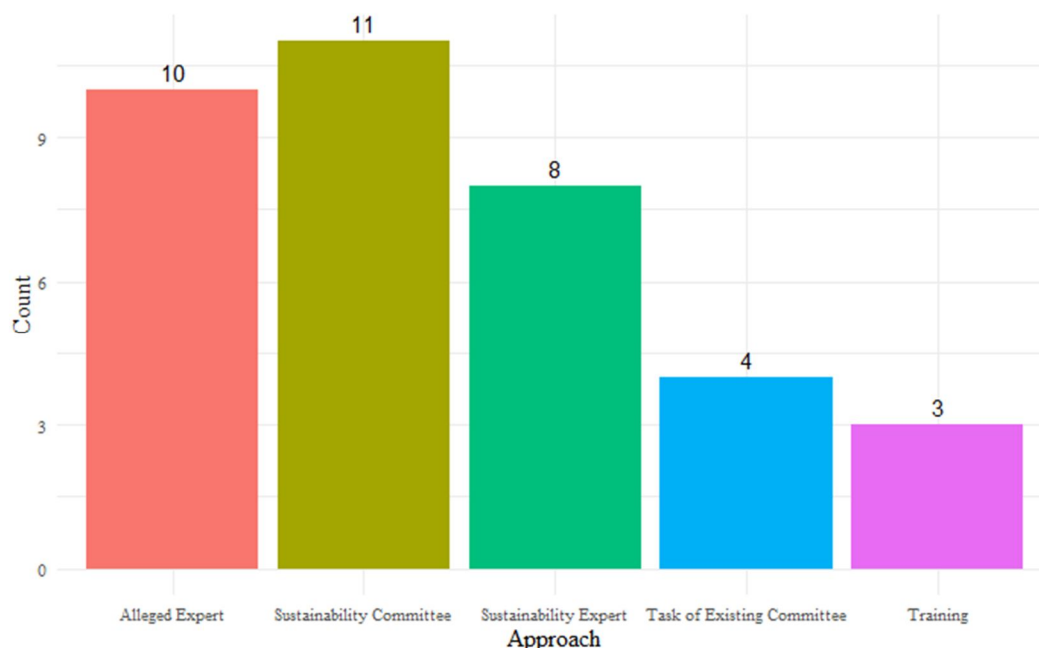


Figure 3 - Count of structural approaches

2.1. Sustainability Committee

The most common structural approach is establishing a sustainability committee. There are 11 supervisory boards in the sample that established such a committee¹³. Among the responsibilities of these committees are commonly mentioned: addressing sustainability/ ESG topics; monitoring the corporate sustainability strategy; setting ESG remuneration targets for the management board; and ESG reporting.

I examine older annual reports to determine when each committee was established. I discovered that 8/12 committees were established in 2021, 2/12 in 2020, one in 2019 and one in 2022. This indicates that sustainability committees are a new phenomenon that started in the last two years. This ties into the theory I propose in Section V.1, where I argue that the rise in sustainability experience among DAX index members can be traced back to backlash following the Wirecard scandal, as it is after this point that sustainability committees started to appear.

Notably, half of the sustainability committees have a dual function indicated by their name (for example, “Innovation and Sustainability”, “Strategy and Sustainability”). By examining older annual reports, I determine that 5/6 committees that have a dual function

¹³ The committees were not always named “Sustainability committee”. For example, Bayer has an “ESG Committee” and Deutsche Post has a “Strategy and Sustainability Committee”. For the sake of simplicity, I refer to all the committees as a “Sustainability Committee”.

were renamed. Meaning that the sustainability responsibility was added on to an existing committee and the name of that committee was changed to include “Sustainability”. Furthermore, not all sustainability committees have sustainability experience on them. Namely, one third of the sustainability committees have no sustainability experience. This indicates that this approach is not always implemented as a genuine attempt to increase sustainability experience in the supervisory board. Rather, some supervisory boards use it as a way to take easy action to signal that measures are being taken to address sustainability on the corporate governance level.

2.2. *Alleged Experts*

The second most common approach I call “Alleged Experts”. This is essentially false branding of an existing board member without any evident experience in sustainability, as a sustainability expert. This alleged expert is then delegated the responsibility for sustainability issues in the supervisory board. By examining a company’s annual report or website I come across 10 such instances¹⁴. In order to determine if the respective supervisory board member has sustainability experience, I follow the process laid out in the [Methodology section](#)¹⁵. If I find no evidence of sustainability experience, I consider this board member to be an alleged expert.

A potential reason for this phenomenon could be that the supervisory board members can self-select as having sustainability experience. This is indicated in some annual reports (see Appendix 2). Given that there is an incentive for the supervisory board to portray a high level of competence with respect to the composition of its members and their skills, board members can be more inclined to say they do have sustainability experience if it is stated as part of the competency profile. Moreover, it is not stated in the annual reports how the evaluation of the competencies of the supervisory board members was performed or if it was performed at all. This leaves the door open for board members to make false claims about their alleged sustainability experience.

2.3. *Sustainability Expert*

The third approach is for a supervisory board to nominate a new member with sustainability experience or find presiding board members with sustainability experience. This board member is then delegated the responsibility for sustainability issues in the supervisory

¹⁴ These claims were usually made in the competency/ diversity profile in the annual report.

¹⁵ I also conduct an online investigation, regardless if I find keywords that appear in the primary or secondary array.

board. Similar to the alleged experts approach, I come across this approach by examining annual reports and the official websites and find 8 such instances.

To determine how if the sustainability expert was recruited to the board for their experience in sustainability I conduct a web search on each sustainability expert and try to find evidence that confirms this¹⁶. For most sustainability experts I don't find evidence that indicates they were nominated for their sustainability experience. This leads me to conclude that most supervisory boards look within their own ranks for sustainability experience, rather than recruit a new member. To me, this indicates a lack of commitment on the part of the supervisory board to a genuine attempt to increase their competence in sustainability, as they seem to be reluctant to put sustainability as a priority for future nominations.

2.4. Task of Existing Committee

Another approach supervisory boards can take is to delegate the responsibility for sustainability issues to an existing committee. I come across four such instances. In all four instances, the audit committee is the one that receives this responsibility. This could be because the GCGC calls for the audit committee to be responsible for overseeing the accounting and reporting processes, which include ESG reports. Upon examination, I find that in only 1 of the 4 cases the audit committee has sustainability experience. This leads me to conclude that, for the most part, supervisory boards that follow this approach use it as an easy way to deal with the topic of sustainability, by branding an entity in the supervisory board that should address such issues.

2.5. Training

Lastly, supervisory boards can conduct training or workshops on sustainability topics. Conducting training is common in supervisory boards. It serves to develop the competencies required by the supervisory board members to fulfill their duties. Given that this is a rather simplistic method, it is surprising that it was the least implemented approach in the sample. Perhaps there is not a sufficient supply for executive training in sustainability. As the annual reports don't provide details on the nature of the training, this is hard to determine. Conducting research on such training and their effectiveness could shed more light on this issue.

3. Industry Analysis

¹⁶ For the most part the search includes searching the board member's name in a search engine. The evidence usually comes in the form of an article.

Next, I take the industry perspective and I examine if the industry the company is active in has an influence on sustainability experience in its supervisory board. First, I categorize the 78 companies in the sample into 26 industries¹⁷. Next, I look at the amount of supervisory boards with sustainability experience in each industry. Figure 4 shows the results of the analysis. Notably, in following industry categories there is a majority of companies with sustainability experience in the supervisory board: “Automobiles and Trucks”, “Utilities”, “Consumer Goods”, “Apparel”, “Retail”, and “Construction Materials”, “Insurance”, “Food Products”, “Electronic Equipment” and “Aircraft”. However, this is not a clear picture and I cannot determine that any group of industries is responsible for the overall amount of sustainability experience in the general sample. Nevertheless, a more detailed look at some of the industries brings some insights.

The industry categories “Automobiles and Trucks”, “Consumer Goods”, “Apparel”, “Retail” and “Insurance” are predominantly B2C, with very recognizable brands such as “BMW”, “Beiersdorf”, “Adidas”, “Zalando” and “Allianz”. This supports the hypothesis that companies with a larger brand could be more likely to be early to integrate sustainability into their corporate governance. A closer examination of the structural approaches doesn’t reveal a predominant approach in these industries.

Additionally, “Automobiles and Trucks”, “Apparel” and “Utilities” are industries that are associated with high levels of contamination. They were considered to be among the top 10 most polluting industries according to a report by Pure Earth (2016)¹⁸. This supports the hypothesis that companies in environmentally sensitive industries are more likely to have sustainability in their supervisory board. However, the categories “Chemicals”, “Transportation”, and “Pharmaceutical Products”, which are also considered to be highly polluting industries, do not have a majority. This could mean that being active in an environmentally sensitive industry doesn’t necessarily translate to having sustainability experience in the supervisory board.

Lastly, it is worth mentioning that just because a company doesn’t have a sustainability experience in the supervisory board, doesn’t mean that sustainability is not addressed at the corporate governance level at all. As a matter of fact, the vast majority of the companies in the sample have implemented sustainability strategies or policies to some extent. Most often among companies in the sample, the board of management carries the

¹⁷ For the categorization I use the Fama/French industry categorization available on:

https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_48_ind_port.html (Retrieved May 2022)

¹⁸ This report measured pollution in Disability-Adjusted Life Years (DALYs) which considers all forms of pollution. Despite the data being relatively dated, this kind of comparison is superior to other more recent studies, which, for the most part, focus on one type of pollution, or themselves rely on data from that period.

responsibility to address sustainability issues on the top management level (some boards have even created a Chief Sustainability Officer (CSO) position). Hence, the lack of sustainability experience in highly polluting industries could be because the company has already addressed the issue in the board of management and doesn't see a need to extend that responsibility to the supervisory board.

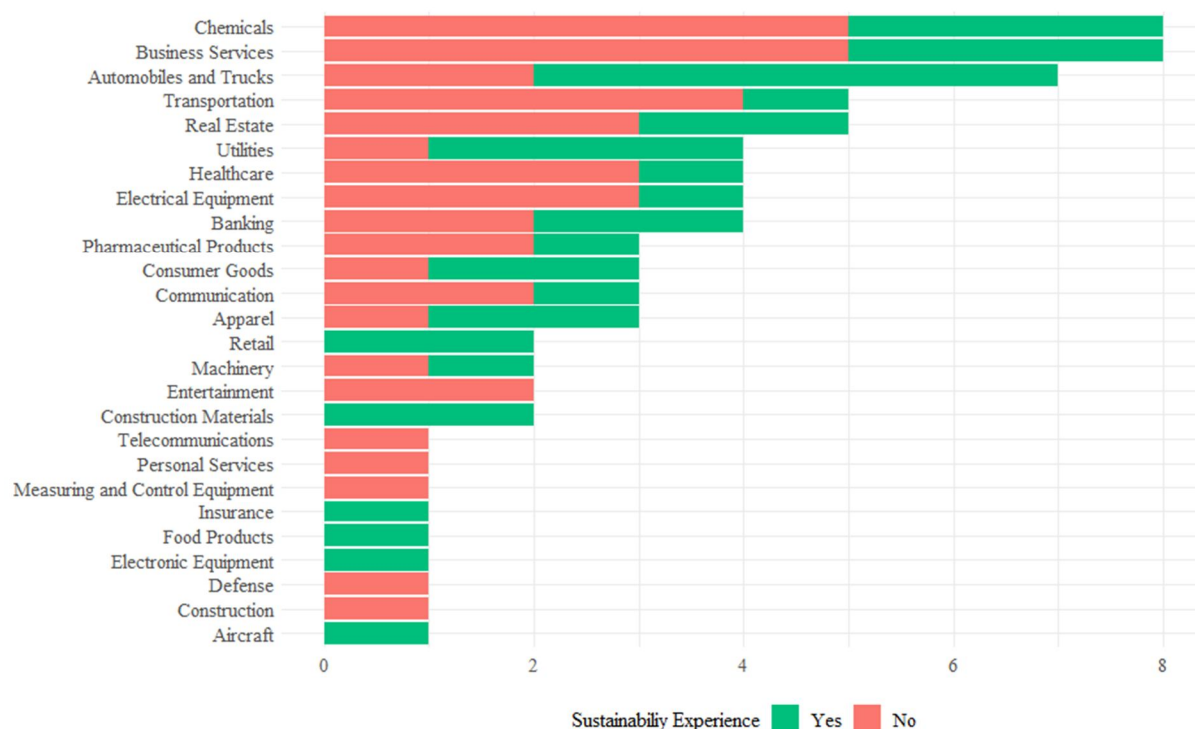


Figure 4 - Number of companies per industry divided by *Sustainability Experience*

4. Profile of Members with Sustainability Experience

In my final analysis, I take the individual board member perspective and establish a profile of a board member with sustainability experience. I do this by comparing members with sustainability experience to members without sustainability experience with respect to each characteristic.

Before I look at each individual characteristic, I provide an overview of the amount of supervisory board members with sustainability experience in the sample. Figure 5 shows that, overall, there is a very small number of board members with sustainability experience. Only 47 out of the sampled 932.

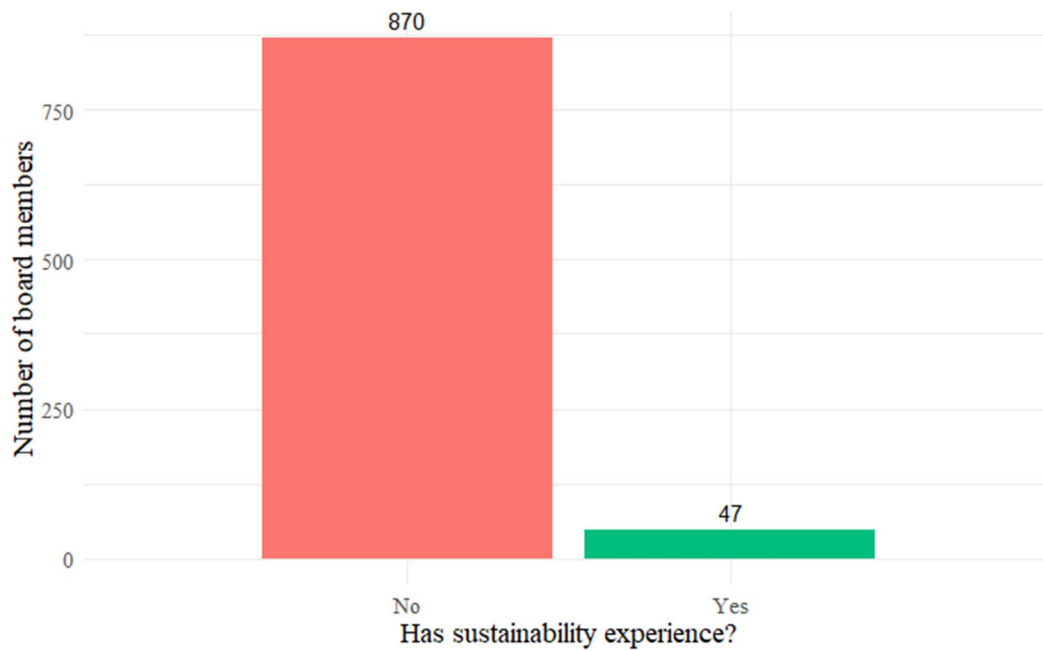


Figure 5 - Very few supervisory board members in the sample have sustainability experience

4.1. Gender

I start my analysis by looking at the gender of the supervisory board members. First, I look at the distribution of gender in the sample. Figure 6 shows that most of the board members in the sample are male with a ratio of about 2:1. Next, I examine only the board members with sustainability experience. After the subsetting the picture is different. I observe that most supervisory board members with sustainability experience are female (see Figure 7). I conduct a binomial test to determine conclusively that this is not caused by random change. The results of the test can be seen in Table 4. As a success I consider drawing a male board member from the general sample, this can be seen in column (1). As the p-value is much lower than 0.05, I reject the null hypothesis and conclude that the majority of females is not due to random chance.

This is in line with the conclusion of Imbulana Arachchi & Managi (2021), which found that women are more likely to be interested in sustainability than men. Following this finding, it would seem that women not only show interest but translate that interest into action and actively seek out carriers that revolve around sustainability. Moreover, this finding is in line with past research that has shown that gender diversity in boards of management leads to better CSR reporting (Dienes & Velte, 2016), better implementation of environmental strategies (Glass et al., 2016), and an overall positive effect on the company's sustainability initiatives (Kassinis et al., 2016). It would seem that the presence of women in the top

management team has a positive effect on integrating sustainability into corporate governance.

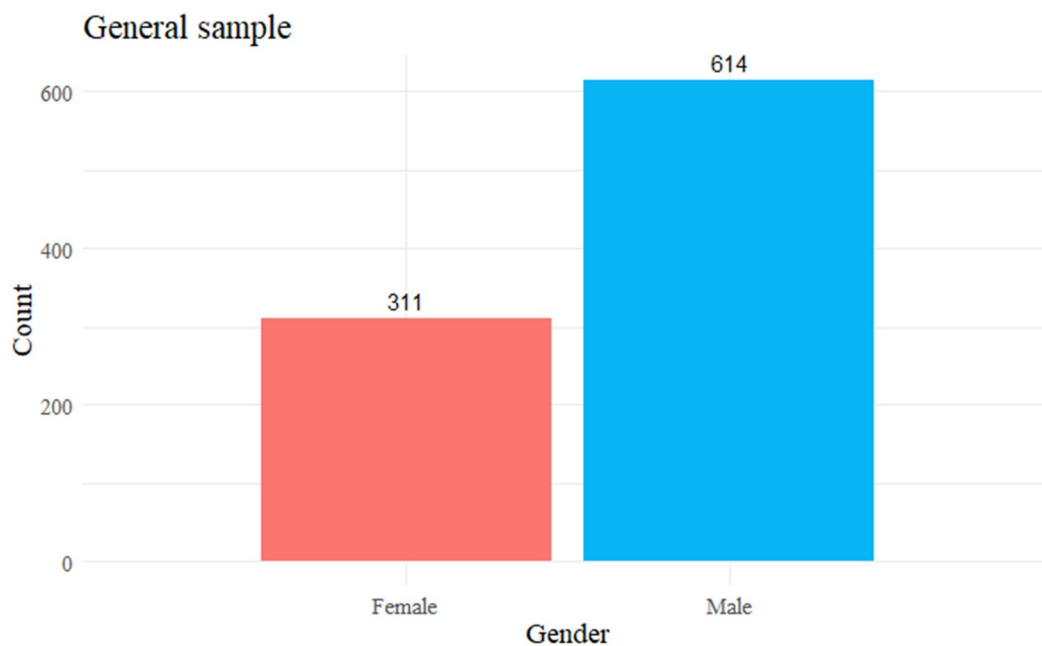


Figure 6 - Most of the supervisory board members in the general sample are male

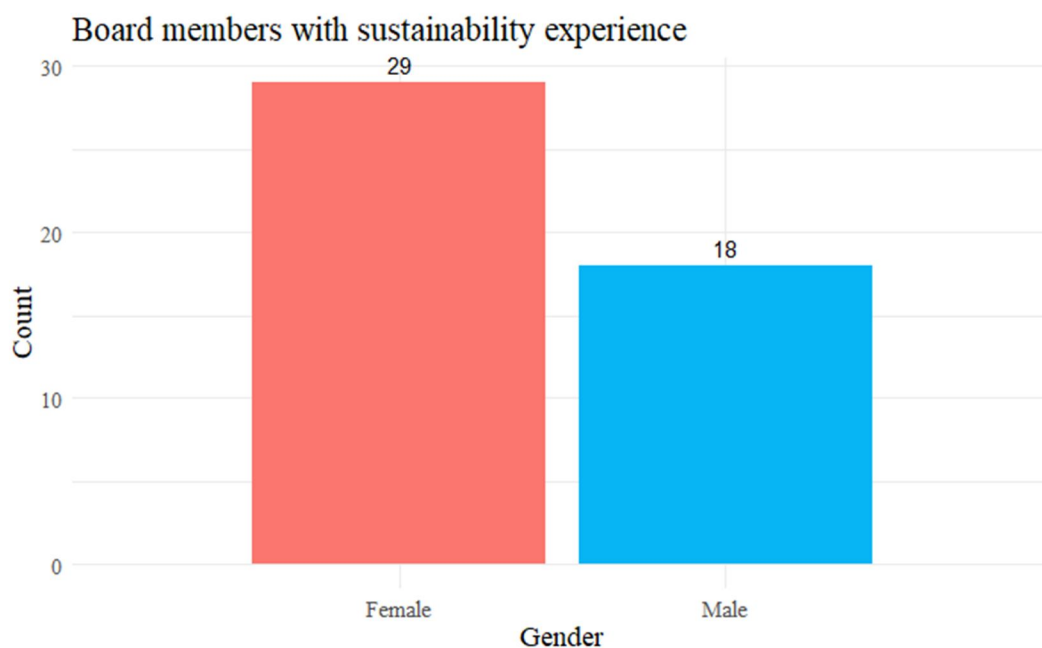


Figure 7 - Most board members with sustainability experience are female

4.2. *International*

I continue to examine the nationality of the supervisory board members. Perhaps members with sustainability experience are more likely to have an international background, as supervisory boards are not limited to recruiting board members solely from Germany. To

examine the nationality of the board members, I compare board members with a German nationality to members with an international background. As the sample consists of more board members without sustainability experience than with, I consider proportions and not absolute values. Figure 8 shows that 40.43% of board members with sustainability experience are international, compared to 20.99% in the group without sustainability experience. To check if this difference is significant, I conducted a Z-test. Table 8 shows the parameters used for the test and the result of the test. The test shows that the difference is significant (P-value = 0.003). I conclude that board members with sustainability experience are more likely to be international than board members without sustainability experience.

This finding indicates that there could be a disparity in sustainability experience in Germany compared to abroad, which might lead German supervisory boards to look for candidates from other countries.

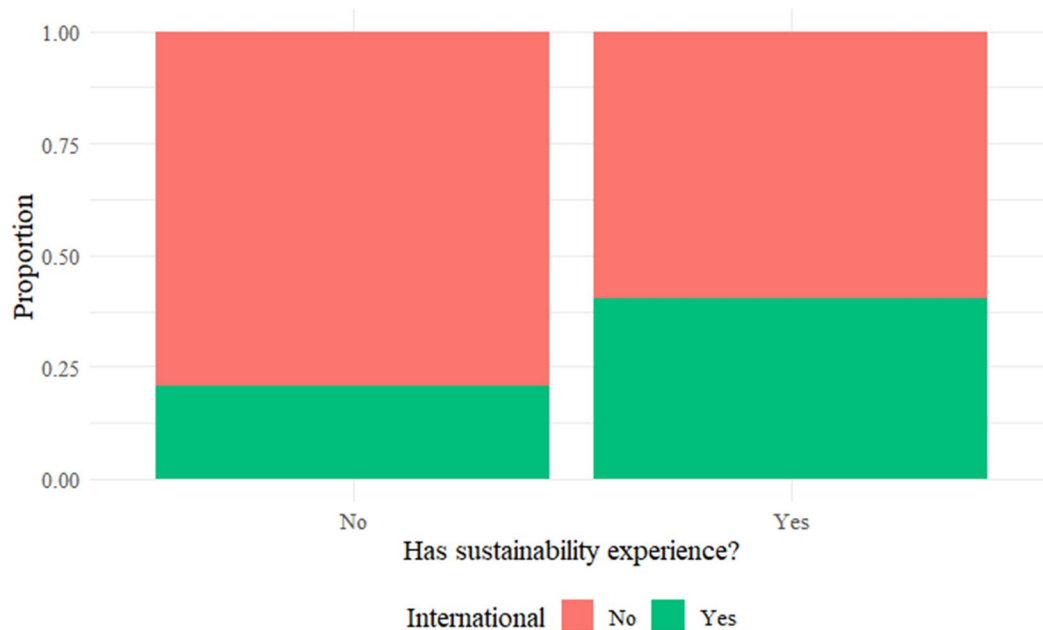


Figure 8 - Board members with sustainability experience are more likely to be international

4.3. Committee Participation

Next, I examine the committee participation to determine what committees board members with sustainability experience are more likely to participate in. Participation in a committee likely means that the respective board member has experience in that domain. Thus, the result of an analysis of the committee participation should serve as an indicator for the functional background of board members with sustainability experience.

In the general sample there are 48 different committees. As not all committees have members with sustainability experience, I consider only committees that have at least one

board member with sustainability experience. This reduces the sample to 15 committees. I continue my analysis considering these committees only. As some committees have similar functions, I cluster the committees by function, as indicated by the committee's name. For example, I cluster the committees "Sustainability", "Innovation and Sustainability", "Strategy and Sustainability" and "Ethics Compliance and Sustainability" together under the cluster *Sustainability*. As some committees could be clustered to more than one cluster, for example "Innovation and Sustainability" can be part of a *Sustainability* cluster and an *Innovation* cluster, these were counted more than once. More details on the clustering is seen in the notes of Table 3. As some clusters have more members than others, they are more likely to have members with sustainability experience. To control for this, I calculate the proportion (column (4) in Table 3) of board members with sustainability experience in the cluster (i.e. column (3) / column (2)). The final result is 9 clusters that can be seen in Table 3.

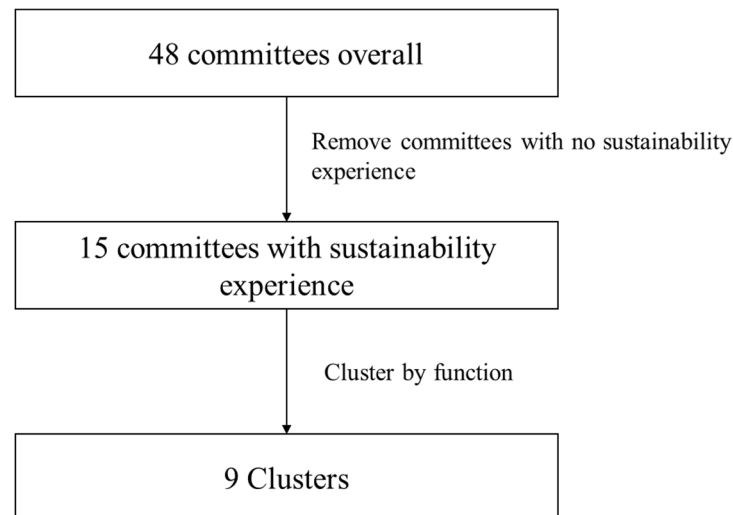


Figure 9 - Clustering procedure

Unsurprisingly, the cluster with the most sustainability experience is "Sustainability" with a proportion of 31.5%. Although, this is lower than one would expect with less than a half of the board members in sustainability committees having sustainability experience. This indicates that even in the committees that are supposed to be responsible for sustainability issues, sustainability experience is relatively scarce.

The next highest is the "Finance" cluster with 17.39%. Although there seems to be no literature that provides a clear overview of the functional backgrounds of German supervisory board members, a study by BCG that surveyed 120 German and Austrian supervisory boards has shown that supervisory boards feel they have good (sometimes too much) finance competence (Kratz, 2018). Likewise, board members of FTSE 350 companies claim that

boards “are too full of financial backgrounds” (Goyal et al., 2019). This leads me to believe that the prevalence of board members with both sustainability and finance experience is due to high levels of finance experience in supervisory boards in general and not among members with sustainability experience in particular.

Likewise, the “Innovation” cluster is number three in terms of proportion of sustainability experience with 15.38%. This is in line with the findings of Kuzma et al. (2020), who found a strong correlation between a company's innovation efforts and its sustainability performance. This finding reinforces the link between these two domains. Thus, it could be the case that board members with experience in innovation have accumulated experience in sustainability or vice versa.

Notably, the cluster “Audit”, consisting of all the audit committees, has a relatively low amount of sustainability experience with only 4.7%. This means that only around 5% of all audit committee members in the sample have sustainability experience. This does not look good in light of recommendation D.4 of the new draft of the GCGC, which states that the chair of the audit committee should have experience with sustainability reporting. Currently, it looks like most supervisory boards are likely not capable of fulfilling this recommendation.

The clusters “Nomination”, “Executive” and “Mediation” do not represent functional backgrounds, as they consist of committees that help with the activities of the supervisory board, such as preparing for meetings, proposing potential candidates, and ensuring a majority vote. Hence, they do not provide insight into a board member's functional experience.

The cluster “Special” consists of various committees that are industry specific (e.g. Diesel Engines Committee)¹⁹. Thus, no meaningful insight on functional background can be derived.

¹⁹ During data collection such industry specific committees were all grouped under the “Special” umbrella term to avoid an inflation of committee names.

(1) Cluster	(2) # of members	(3) # of members with sustainability experience	(4) Proportion
Sustainability	19	6	0.315789474
Finance	23	4	0.173913043
Innovation	26	4	0.153846154
Nomination	63	8	0.126984127
Special	9	1	0.111111111
Executive	66	4	0.060606061
Mediation	34	2	0.058823529
Audit	293	14	0.04778157
Personnel	29	1	0.034482759

Notes:

The following clustering was applied: **Sustainability** = (Sustainability, Innovation and Sustainability, Strategy and Sustainability, Ethics Compliance and Sustainability); **Finance** = (Finance and Investment, Innovation and Finance, Investment); **Innovation** = (Innovation, Innovation and Sustainability, Innovation and Finance); **Nomination** = (Nomination, Executive and Nomination); **Special** = (Special); **Executive** = (Executive, Executive and Nomination); **Mediation** = (Mediation); **Audit** = (Audit); **Personnel** = (Personnel)

Table 3 - Clustering of committees

4.4. PhD

I continue with the educational background of the board members, namely I consider if they have obtained a PhD. Like the analysis of *Nationality*, I compare the proportions of PhD holders among board members with sustainability experience to those without and instead of absolute values. This is because there are more members without sustainability experience than with. I see that 36.17 % of the board members with sustainability experience have a PhD compared to 25.22% in the other group. I conduct a Z-test that reveals that this difference is not significant (P-value = 0.0949). Table 9 shows the parameters used for the test. Hence, I conclude that board members with sustainability experience are not more likely to have a PhD.

4.5. *Shareholder Representatives vs. Employee Representatives*

I proceed to examine if board members with sustainability experience are more likely to be shareholder representatives or employee representatives. In the general sample most of the board members are shareholder representatives with a majority of 58%. In the sub-sample of board members with sustainability experience that majority is even higher with 91%. I do not conduct a statistical test, as the difference is so large it is very unlikely to be caused by random chance. In addition, the result makes sense as employee representatives come from positions in the core competencies of the company and, therefore, are unlikely to have knowledge in sustainability. I conclude that board members with sustainability experience are more likely to be shareholder representatives.

4.6. *Age*

As younger generations seem to care more about sustainability issues (Yamane & Kaneko, 2021), it could be that board members with sustainability experience are younger than their peers. First, I examine the general sample. The average age of the board members is 58.02. Then, I control for sustainability experience and see that the average age for board members with and without sustainability experience is almost the same with 58.58 and 57.94 respectively. I conduct a Welch two sample t-test, which reveals that there is no significant difference in the average age between the two groups (P-value = 0.2145). The parameters used and the result of the test can be seen in Table 5. I conclude that there is no difference in age between board members with and without sustainability experience.

4.7. *Tenure*

Finally, I inspect the tenure of the board members. As the demand for sustainability experience among executives is new, I suspect that members with sustainability experience were nominated more recently. The average tenure of the board members in the general sample is 5.93 years. Next, I control for sustainability experience and see that the average tenure among members with sustainability experience is 5.88 years and 5.93 years for the other group. I conduct a Welch two sample t-test that reveals that there is no significant difference in tenure (P-value = 0.9559). Table 6 shows the parameters used for the test. I conclude that board members with and without sustainability experience have on average served the same time on the supervisory board.

5. Additional Analysis

5.1. *Board Size*

In addition, I inspect if there is a difference in *Board Size* between supervisory boards with sustainability experience and those without. The size of the supervisory board is positively correlated with the size of the firm (Lakatos, 2020). Thus, a significant difference could indicate which firms, smaller or bigger, are more likely to have sustainability experience in the supervisory board. The mean sizes of supervisory boards with sustainability experience and without are 14.42 and 11.45, respectively. I conduct a Welch two sample t-test, which reveals that there is a significant difference the two groups (P-value = 0.01601). At this point it seems that supervisory boards with sustainability experience tend to be larger. However, this difference could be confounded by another variable. In the sample, most supervisory boards with sustainability experience are in the DAX index. Likewise, in the sample, DAX companies have on average larger supervisory boards (average of 14.45) than MDAX companies (average of 11.28). Hence, I control for the index and conduct a Welch two sample t-test for each index separately. The results are as follows. For the DAX companies the P-value = 0.5971. For the MDAX companies P-value = 0.1316. Both results are not significant. Thus, I conclude that the difference in *Board Size* is confounded by the stock market index. Therefore, I conclude that there is no significant difference in *Board Size* between supervisory boards with and without sustainability experience. Table 7 shows details on the tests.

VI. CONCLUSION

The aim of this thesis is to examine the amount of sustainability experience in supervisory boards of listed German companies. I do this by examining 78 supervisory boards of German listed companies in the DAX and MDAX stock market indexes. This investigation was initiated by the publication of a new draft to the GCGC that includes recommendations for sustainability experience in the supervisory board. I collected data via CV and annual reports research of the companies in the sample. By looking at the data from three different perspectives (supervisory board structural perspective, industry perspective, and individual supervisory board member perspective) I provide evidence on the following. Overall, there is a low level of sustainability experience in German supervisory boards, with most of the companies in the sample not having sustainability experience in their supervisory board. Moreover, I find that companies that are members of the DAX index are more likely to have sustainability experience on the supervisory board. I discovered that supervisory board members use 5 different structural approaches to address sustainability issues, the most common of which is to establish a sustainability committee. With respect to this I also find

that some of the approaches used by supervisory boards can be considered “green washing” attempts. I conduct an industry analysis and examine which industries are more likely to have supervisory boards with sustainability experience. I provide evidence that industries with firms with high brand awareness, such as the automotive industry, are more likely to have sustainability experience on the supervisory board. Likewise, I provide evidence that companies in highly polluting industries are more likely to have sustainability experience in the supervisory board. I investigate the average profile of supervisory board members with sustainability experience. I find that such board members are more likely to be female than male and are more likely to be international. Moreover, by examining the supervisory board committee participation of members with sustainability experience I find that they are the most likely to have a finance or an innovation functional background. I contribute to prior research on the GCGC by investigating how capable German companies are to comply with the new recommendations set in the new draft. I contribute to the literature on board diversity and sustainability corporate governance, by providing an insight to the effect of the contribution of gender diversity on sustainability in German supervisory boards.

My thesis has several limitations. First, the data collection was done by one person. This leads to bias and a higher probability of human error, in particular when detecting the main variable of interest - *Sustainability experience*. Second, the sample size is small due to the limitation of the bachelor thesis. This particularly affects the validity of the results of the industry analysis. Third, my investigation was done before the new version of the GCGC was released. In the time between the publication of the first draft and until the release of the new version, the data might have changed.

As this thesis shows the situation as it is before the implementations of the new version of the GCGC, future studies could conduct a similar analysis some time after the new version has been valid, to show if there has been any change to the level sustainability experience in the supervisory boards after the companies have had some time to react to the new recommendations.

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VIII. APPENDICES

Appendix 1 - Example of CV with Sustainability Experience



Barbara Kux

Private Investor, Zürich, Switzerland

Born in Zürich, February 26, 1954

Member since: July 3, 2013

Elected until: 2024



Career

Since 2014	Director for Corporate Governance, INSEAD, Fontainebleau, France
Since 2014	Lecturer, University of St. Gallen, St. Gallen, Switzerland, Business Strategy and International Management
2008 – 2013	Executive Vice President Supply Chain Management and Sustainability, Siemens AG, Munich
2003 – 2008	Group Management Committee member responsible for Supply Management and Sustainability, Royal Philips, Amsterdam, Netherlands
1999 – 2003	Executive Director Central Europe, Ford Motor Company, Ford of Europe, Cologne
1993 – 1999	President, Nestlé Polska Holding, previously Vice President Central/Eastern Europe, Nestlé S.A., Vevey, Switzerland
1989 – 1993	Vice President, ABB Zürich, Switzerland, then President, ABB Power Ventures; 1992 Senior Vice President Finance, BBC Brown Boveri Ltd, ABB Asia Brown Boveri Ltd., Switzerland
1984 – 1989	Engagement Manager, previously Management Consultant, McKinsey, Inc., Germany

Education

1989	Seminar for Senior Executives, IMD, Lausanne, Switzerland
1983 – 1984	Master of Business Administration with distinction, INSEAD, Fontainebleau, France
1972 – 1973	Exchange student scholarship to USA, American Field Service

Memberships of statutory supervisory boards in Germany:

Henkel AG & Co. KGaA

Memberships of comparable domestic or foreign oversight bodies of commercial enterprises:

Firmenich S.A. (Vice Chair), Switzerland

Appendix 2 - Example Board Members Self Selecting to Have Sustainability Experience

Supervisory Board Qualifications Profile

Name	Independent	Year of birth	Year appointed	Nationality	Key skills & areas of experience*							
					Finance, accounting, financial planning and analysis	Real estate	Strategy	Legal and regulation	International experience, M&A, capital markets	Investment expertise	Digitalization	Sustainability
Jürgen Fitschen (Chairman)	yes	1948	2018	German	x		x	x	x	x		
Prof. Dr. Edgar Ernst	yes	1952	2013	German	x		x	x	x	x		
Burkhard Ulrich Drescher	yes	1951	2014	German		x	x	x			x	x
Vitus Eckert	yes	1969	2018	Austrian		x	x	x	x	x		
Dr. Florian Funck	yes	1971	2014	German	x		x	x	x	x		
Dr. Ute Geipel-Faber	yes	1950	2015	German	x	x			x	x		x
Daniel Just	yes	1957	2015	German	x	x	x			x		x
Hildegard Müller	yes	1967	2013	German	x		x	x			x	x
Prof. Dr. Klaus Rauscher	yes	1949	2008	German	x	x	x	x	x			
Dr. Ariane Reinhart	yes	1969	2016	German			x	x	x		x	x
Clara-Christina Streit	yes	1968	2013	German/U.S.	x		x		x	x	x	
Christian Ulbrich	yes	1966	2014	German		x	x		x	x	x	
* The members of the Supervisory Board can specify up to 5 areas of experience.												

Taken from the 2020 annual report of Vonovia SE.

Appendix 3 - Statistical Tests

Table 4 - Binomial test for gender among members with sustainability experience

(1) Probability of success	(2) # of observations	(3) P-value
0.6641631	47	7.39931E-05

Table 5 - Parameters and results of t-test for difference in average age

Mean in group 1	Mean in group 2	# of observations in group 1	# of observations in group 2	T-value	P-value
57.94	59.58	868	45	-1.2578	0.2145

Notes:

Group 1 refers to board members without sustainability experience and group 2 refers to those with.

Table 6 - Parameters and result of t-test for difference in tenure

Mean in group 1	Mean in group 2	# of observations in group 1	# of observations in group 2	T-value	P-value
5.933	5.889	851	45	0.0556	0.9559

Notes:

Group 1 refers to board members without sustainability experience and group 2 refers to those with.

Table 7 - Parameters and result of t-test for difference in board size

General Sample					
Mean in group 1	Mean in group 2	# of observations in group 1	# of observations in group 2	T-value	P-value
11.4524	14.4167	42	36	-2.4649	0.016
DAX					
Mean in group 1	Mean in group 2	# of observations in group 1	# of observations in group 2	T-value	P-value
13.8333	14.7308	12	26	0.5354	0.5971
MDAX					
Mean in group 1	Mean in group 2	# of observations in group 1	# of observations in group 2	T-value	P-value
10.5	13.6	30	10	-1.5911	0.1316

Notes:

Group 1 refers to supervisory boards without sustainability experience and group 2 refers to those with.

Table 8 - Parameters and result of Z-test for difference in proportion of international board members divided by sustainability experience

Internationals in group 1	Internationals in group 2	# of observations in group 1	# of observations in group 2	Proportion group 1	Proportion group 2	Pooled proportion	Z-value	P-value
183	19	872	47	0.2098624	0.4042553	0.2198041	-3.134802	0.0017197

Notes:

Group 1 refers to all members without sustainability experience and group 2 refers to all members with sustainability experience.

Table 9 - Parameters and result of Z-test for difference in PhD holders

PhDs in group 1	PhDs in group2	# of observations in group 1	# of observations in group 2	Proportion group 1	Proportion group 2	Pooled proportion	Z-value	P-value
220	17	872	47	0.2522936	0.3617021	0.257889	-1.670128	0.09489399

Notes:

Group 1 refers to all members without sustainability experience and group 2 refers to all members with sustainability experience.