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**Quality of Risk Reporting of selected DAX Performance Index Corporations**

**- An Empirical Analysis of Compliance**

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I certify that the dissertation entitled: Quality of Risk Reporting of selected DAX Performance Index Corporations - An Empirical Analysis of Compliance

submitted for the degree of MSc in International Business Management is the result of the my own work and that where reference is made to the work of others, due acknowledgment is given.

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## Abstract

The German legislator requires German stock corporations to state their risk reporting in their annual report in accordance with the German Accounting Standard. After the standard was updated in 2012, corporations had several years to implement the requirements of the standard correctly and accurately. As a result, the study seeks to determine the corporation's risk reporting quality, ranking them and present the current deficits in their risk reporting's.

The standards were used to develop an evaluation model in which the mandatory and recommended standards were weighted and then evaluated against each of the risk report sections of the examined corporations. As a result, each corporation received a compliance percentage for the standard's mandatory and recommended requirements, sectors, and standard categories (risk management system, individual risks and risk situation).

In their risk reports, the examined corporations did not achieve an overall compliance degree of 60 per cent. Not all corporations were able to present their information in compliance with the DRS 20 standards. BMW, the Volkswagen Group, and Henkel attained the highest level of compliance. Deutsche Wohnen and Deutsche Post had the lowest degree of compliance.

The risk reporting quality of the corporations examined was adequate since not a single corporation achieved a higher compliance degree of 60 per cent. Only a few corporations came close to achieving a high level of compliance. As well as several corporations viewed the significance of the mandatory and recommended standards differently.

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## List of Abbreviations

AktG	Stock Corporation Act
BilMoG	Accounting Law Modernization Act
BilReG	Accounting Law Reform Act
BilRUG	Accounting Directive Implementation Act
BMJ	Federal Ministry of Justice
DAX	German share index
DPR	German auditing agency for accounting
DRS	German accounting standard
DRS 20	German Accounting Standard No. 20 "Group Management Report"
DRS 5	German Accounting Standard No. 5 "Risk Reporting"
DRSC	German Accounting Standards Committee
ibid.	In the same place
Etc.	Et cetera
EY	Ernst & Young
GoB	Principles of proper accounting
HDAX	Successor to the DAX 100, consists of DAX, MDAX and TecDAX stocks
HGB	Commercial Code
KonTraG	Law on control and transparency in the corporate sector
MDAX	Mid-cap DAX
No.	Number
PwC	PricewaterhouseCoopers
s.	please refer
SDAX	Small-cap DAX

# 1. Introduction and Objectives

German accounting regulation is distinguished by the focus on the various information requirements of capital market participants. Depending on its legal form and size, the corporate group must fulfil a variety of reporting obligations to meet the information needs of its stakeholders in the context of capital market communication (Deutschland et al., 2020, 556). Corporations must fulfil various reporting obligations to meet the information needs of their stakeholders in the context of capital market communication, depending on their legal form and size.

The annual financial statements required by commercial law, on which the emphasis is placed, are intended to provide a true and fair picture of the assets, financial, and earnings position (Fink et al., 2013, 3). However, the report's past-oriented section does not fully meet all stakeholders' information needs, especially those seeking non-financial and future-oriented information from corporations (ibid., 3). In Germany, the annual report aims to supplement and explain the annual financial statement and more (Baetge et al., 1989, 7). According to the general standard for management reporting by § 289 Section. 1 Handelsgesetzbuch (HGB) und § 315 Section. 1 HGB of the German Commercial Code for the group management report (Tesch & Wißmann, 2009, 25), the course of business, including the business results and the corporation's position, must be presented in such a way that they convey a true and fair view (Baetge et al., 2017, 742). The German Accounting Standards 20 (GAS 20) "Group Management Report" supplements the commercial law regulations. This standard governs management reporting for all parent entities required by the German law or voluntarily prepare a group management report by section 315 of the HGB. It encourages using the standard in management reports prepared by the HGB section 289 (DRSC, 2012, DRS 20.1-2.). The goal of group management reporting under this standard is to report on how the management used the group's resources during the reporting period and to provide information that allows a knowledgeable user to obtain a proper understanding of the group's course of business, position, and expected development, as well as the opportunities and risks associated with this development (ibid, DRS 20.1-2).

Risk reporting is a significant part of the management report for businesses, stakeholders, and shareholders. Management reporting underwent significant changes due to the new DRS 20 regulations approved by the German Accounting Standards Committee (DRSC) on the 14th of September, 2012 (Peter Kajüter et al., 2010, 457-

465). Corporations faced the challenge of applying the new regulations in their risk reports in the 2013 fiscal year for the first time.

As the DRS 20 standards enter their tenth year of implementation, it is important to observe how the DAX 30 corporations follow the standards. When corporations communicated about their risk management system, individual risks, and overall risk situation, they had time to implement the standards and properly adapt to these changes in their risk report. The development of the risk report has grown in importance over the years due to its value and future-oriented information from the management perspective.

The management report has an auxiliary function in terms of time with the risk report. The largely past-oriented information in the annual financial statements is supplemented by mandatory prospective reporting every year. Because of its forward-thinking perspective, it is used by capital-market-oriented corporations and report recipients. Its primary responsibility is to provide information to the recipients that can be used to make decisions about the corporation's expected development based on the most important financial and non-financial risk indicators. However, risk management can minimise the principal-agent problem through risk-adequate evaluation of investments and remuneration of management, in the course of which the cost of capital can be reduced (Wengert & Schittenhelm, 2013). However, potential investors must be adequately informed about decision-relevant information regarding risk management and risk (ibid, 2013, 1). This function is taken over by risk reporting, which investors place a high value on (Rautenstrauch, 2014, 185). Comprehensive and credible risk reporting helps, on the one hand, to reduce information asymmetries between corporations and their stakeholders and shareholders (Filipiuk, 2009, 3). However, on the other hand, it is also subject to the possibility of publishing information that is sensitive to competition (Brauweiler, 2019, 115). Against this background, there is a gap between the willingness of corporations to publish information about their risk situation and the information needed by investors (Filipiuk, 2009). Normative standards such as the German Accounting Standard No. 20 "Group Management Report" (DRS 20) provide substantive details of the legal basis to improve the quality and thus the information content of risk reporting.

### 1.1. Objectives of the Study

The current study aims to close the identified research gaps by empirically investigating the risk reports required by commercial law. In this context, current deficits in risk reporting will be presented. The examined corporations will be ranked based on their

risk reports compliance with the DRS 20 standards. Finally, an overall statement will be made about the adequate communication of decision-relevant information. To that end, as a core component of risk reporting, the principal-agent problem is discussed further, followed by an explanation of the legal-normative context in Germany. After analysing the current state of research in the context of a literature review, the empirical analysis will be presented. In this setting, the following will be laid out: an explanation of the objective and delimitation of the study, a description of the data basis, the DRS 20 as a target benchmark, and the valuation model. The study's overall objectives are as follows:

- Present the status quo in the quality of corporations of the DAX 30's reporting on risk management, individual risks and the risk situation.
- Present current deficits in the risk reporting of DAX 30 corporations and make a statement on the sufficient communication of investment-relevant information within the meaning of DRS 20.
- Ranking of the corporations investigated in terms of their achieved compliance level and ergo the informative value of the published risk reports.

## 1.2. Scope of the Study

The study follows the proven method of content analysis with subsequent scoring to assess the current need for research for fiscal years 2020 and 2019/20. Thus, the following study questions the accuracy of previous analysis predictions of possible learning effects in subsequent years of application. One of the objectives of this study is to present current deficiencies in the risk reporting of the DAX 30 cooperation's and conclude the adequate communication of investment-relevant information within the meaning of the DRS 20 standard. In this regard, one of the study's main findings is the corporations' ranking regarding the level of compliance they have achieved and the significance of the published risk reports. It is worth noting that 24 of the 30 DAX stock corporations are examined. Chapter 4 goes into detail about the reasons for this.

## 2. Critical Literature Review

Several studies have been conducted in recent years to assess the quality of risk reporting. As a result, the studies using the DRS 20 are discussed in sections **Error! Reference source not found.** and **Error! Reference source not found.** Since January 1, 2013, all German capital market-oriented corporations have been required to report on risk and opportunity using the DRS 20 standards and replacing the old DRS 5 standard.

## 2.1. Reporting Practice of DAX30 Corporations

Lackmann et al. looked at how risk and opportunity reporting changed after the DRS 20 was implemented for the first time. In the 2013 financial year, 22 of the DAX 30 corporations were investigated. Because insurance companies and banks have an extended disclosure requirement that would have falsified the research, it was necessary to reduce the sample size to 22 corporations. The number of pages, the description of the risk management system, the risk reporting system, the gross versus net presentation, and the quantification of risks were used to evaluate the DAX 30 corporations (Lackmann et al., 2015, S.48).

The total number of pages in the risk reporting ranged from 2.5 to 33. In terms of scope, this results in a disparate picture of the corporations. It was also discovered that the corporations provided lots of detailed information on risk information. Even if there are no legal obligations under Section 315 HGB and DRS 20 for "equally extensive reporting", "balanced" risk reporting is required.

Lackmann et al. examined the risk management system in businesses following the DRS 20.11. Although the 22 companies reported on the essential aspects of the risk management system varied, all 22 companies reported on the essential aspects of the risk management system. It was discovered that all of the companies investigated provided information about the risk system used and the internal risk management (ibid, 2015, S. 48f).

In general, the companies quantified their future risks in various ways, depending on the likelihood of occurrence and the severity of the consequences. While some companies used interval forecasts to report the probability of occurrence and expected effects, others used a combination of interval forecasts and qualitative information for both measures. Two of the companies investigated did not provide a qualitative or quantitative representation of the sizes did not meet the legal requirements (ibid, 2015, S.49).

The required assessment based on the amount of damage and the likelihood of occurrence is determined, among other things, by whether the risks are presented in gross or net form in the management report (Diederichs, 2012, S.91). According to DRS 20.157, capital market-oriented corporations have an explicit right of choice (Lackmann et al., 2015, S.50). A gross method can also be considered a worst-case approach, as it demonstrates the potential scope of the risk. On the other hand, a net

method takes into account the actual countermeasures taken to reduce risk (Diederichs, 2012, S.91). It should be noted that risk minimisation has an impact on the likelihood of occurrence. According to the study, more than half of the corporations examined (55 per cent) did not provide information on risk presentation. In comparison, seven corporations (32 per cent) assessed the risk according to the net method. Only two of the corporations studied assessed risks using the gross method, and one company assessed risks using both the net and gross methods. Corporate groups that did not provide any information on using the option should be viewed with suspicion according to Lackmann. If these corporations chose a net approach without marking it as such, it could be interpreted as an embellishment or concealment of the risks. Such insufficient reporting makes it even more difficult for external corporation addressees to understand the corporation's risk situation (Lackmann et al., 2015, S.50).

Furthermore, following the DRS 20.152, risks and opportunities must be presented in quantitative form, provided that quantification is also used for internal control and the information is material to the recipient. All 22 companies were found to have provided qualitative information about existing risks and opportunities. Six companies published qualitative and quantitative opportunities, while almost twice as many corporations provided quantitative information on their risks. If the quantification of the risks & opportunities seriously affects the corporations, the group may omit the quantification in accordance with DRS 20.154, stating the reasons. The quantification is usually presented in the form of a risk matrix. This matrix representation has the advantage of making risks more visible, but it also has some drawbacks. A significant disadvantage, aside from the fundamental problem of estimation, is the designation of risk categories. The information content can only be presented to a limited extent with corresponding designations such as "low risk" because the composition of the probability of occurrence and expected damage cannot be fully understood (ibid, 2015, S.51).

Lackmann et al. concluded that implementing the DRS 20 has not resulted in the anticipated improvement in risk and opportunity reporting because most companies have only minimally implemented the legal requirements. The risks and opportunities are typically presented transparent and aggregated; however, the reporting is frequently only outlined abstractly, making the investment process more difficult for external users. Because the DRS 20 only represents a basic framework for risk and opportunity reporting, communication from the perspective of the group management is critical for all companies. The auditor has a certain key role in implementing the DRS 20 since external persons usually do not have access to internally used tax standards. The empirical study by Lackmann et al. shows that in some companies, the risk and

opportunity reporting was not adequately checked by the auditor. In some cases, the requirements of DRS 20 were not implemented at all or only implemented in a minimalist manner. To what extent the German Financial Reporting Enforcement Office sees the company's reporting as legally compliant, however, remains open (Lackmann et al., 2015, S.53).

## 2.2. Reporting Practice and Application Experience at DAX and MDAX Corporations

Kajüter et al. investigated potential changes in risk and opportunity reporting following the initial implementation of DRS 20; 62 DAX and MDAX companies were studied in the 2012 and 2013 fiscal years. To gain a more in-depth understanding, telephone interviews with responsible specialist staff from 15 DAX and MDAX companies were conducted in addition to the content analysis of the annual report. A comparison was made between the old DRS 5 legislation and the new DRS 20.181 legislation based on chosen fiscal years (Peter Kajüter et al., 2015, S.517).

According to the number of words, the report's scope in the 2013 fiscal year increased by 23% compared to the previous year. The above-average expansion of opportunity reporting and the presentation of the risk management system can explain this. Nonetheless, the scope of the opportunities report accounts for only a quarter of the risk report, and the increase in the risk and opportunity report for DAX companies is significantly higher than that for MDAX companies. The DAX companies were able to double the scope of their opportunity reports more than (ibid, 2015, S.518).

The DRS 20.162 requires categorisation of the risks of publicly stock corporations (DRSC, 2012). The German legislator distinguishes between categorising risks based on their significance, e.g. through a ranking, and categorising risks based on factual criteria, e.g. through segments. Only 3 per cent of the corporations chose relative importance as the form of presentation to increase the informative value of the annual report (Peter Kajüter et al., 2015, S.516). In comparison, 11 per cent chose a hybrid of the two. All corporations thought it was necessary to categorise their risks by the regulations, but 13 corporate groups did not think it was necessary to categorise their opportunities. To improve the clarity of the management report, the visualisation of risks and opportunities and categorisation plays an important role. This was used by 83 per cent of the companies to present risks and opportunities using graphs and tables. Adidas is an example of this, as the company used tables to indicate the likelihood of occurrence as well as the potential impact of the risks, according to Kajüter, Niehaus and Morschladt (ibid, 2015, S.519).

The examined corporations reported 45 risks and 13 opportunities on average, with DAX firms reporting more risks than MDAX firms. This is explained by size effects, which hold that larger corporations are more visible in the public eye and thus publish many risks and opportunities. When the revised BilReG was implemented for the first time in the 2005 fiscal year, the average number of risks remained 21, and the average number of opportunities remained one. The predominance of risks over opportunities is still an issue in management reporting. Kajueter et al. assume that corporations interpret company forecasts negatively rather than positively and thus see more risks than opportunities. Furthermore, this approach should help to keep recipients' expectations low. Another reason for reporting on all potential risks is to avoid ex-post accusations of inadequate risk reporting (ibid, 2015, S. 520).

The analysis of reporting practice revealed significant differences in the types of risk and opportunity reporting. External risks and opportunities outnumber internal ones on average. Corporations can only influence external risks to a limited extent or not because they originate in the corporation environment explains the predominance of external risks over internal risks. On the other hand, internal risks are simpler to manage, making them less important to some businesses. Significant risks and opportunities must be identified, assessed, and explained under German law. According to the evaluation of the reporting, 64 per cent of the companies also reported on potential impacts for the risks mentioned. In comparison, only 46 per cent of the potential impacts were presented with the opportunities. DRS 20.152 requires German companies to present individual risks and opportunities in quantitative form in their management reports (ibid, 2015, S.521). The reporting is primarily restricted to market price risks. Furthermore, the analysis reveals that 48 per cent of corporations quantify the probability of occurrence and the potential amount of loss at the risk category level. Seven companies deemed risk quantification superfluous, citing that the likelihood of occurrence and potential consequences are only assessed using internal company criteria (ibid, 2015, S. 523).

### 2.3. Conclusion Literature Review

In summary, the analysis of DAX and MDAX companies during the first application of DRS 20 revealed that the new legal requirements resulted in a positive change in risk and opportunity reporting. Essentially, not only has the scope of reporting expanded significantly, but it has also tended to improve since the 2012 fiscal year. However, there are significant differences in the way reports are ordered and the content of the reports. Despite observable progress in management reporting, Kajüter et al. believe that there is still room for improvement and that further advancements are possible. In

the future, the DRSC should place a greater emphasis on expanding opportunity reporting (ibid, 2015, S.524).

### 3. Conceptual Framework and Theories

The following sections provide the theoretical framework for the study. For this purpose, the statements of the principal-agent theory are first provided as a scientific foundation. This is followed by presenting the legal-normative framework conditions of risk reporting in Germany - more precisely, the DRS20.

#### 3.1. Principal-agent theory

Corporations listed in the DAX performance index in Germany are subject to constant conflicts of interest between their various shareholders and stakeholders on the one side and its management on the other side. Shareholders and stakeholders, in this case, could be investors, employees, customers, or suppliers. Information on a corporation's risk positions is being communicated as part of risk reporting (Gerpott & Hoffmann, 2013, 598). The goal is to provide addressees, particularly investors, with a comprehensive and reliable information base, allowing them to make well-informed decisions based on the risk situation. (Heyd et al., 2014, 177) (Mühlbauer, 2014) (Rautenstrauch, 2014, 191). There is a principal-agent relationship because the managers' public behaviour influences the shareholders' decisions, and there are conflicts of interest and information asymmetries (Marten et al., 2020, 49).

According to Ross (Ross, 1973) and Jensen and Meckling (Jensen & Meckling, 1976), the single-stage model of the principal-agent theory models the relationship between two contracting parties: the principal (in this case, the owners of the corporation) and the agent (in this case the management of the corporation) (Jensen & Meckling, 1976, 308) (Ross, 1973, 134). The theory's characteristics are the different scopes of action, asymmetric information bases and preferences of the individual parties (Marten et al., 2020, 48) (Freidank et al., 2012, 123). Because of the different preferences and the goal of maximising utility, it can be assumed that the agent will not always act by the principle if this interferes with his or her utility maximisation (*Jensen & Meckling, 1976, 309*) (*Ross, 1973,138*). In advance, an optimal contract design can reduce the possibility of information asymmetries in the separation of ownership and control being abused (Marten et al., 2020, 50). Furthermore, the principal can limit the agent problem by establishing control and incentive mechanisms linked to "agency costs" (Jensen & Meckling, 1976, 309). The term "agency costs" covers monitoring- and control costs, contract costs and the residual loss due to a principal-agent relationship as such (Marten et al., 2020, 50). Commitment or bonding can be used to resolve action

conflicts caused by the individual parties' differing preferences. Commitment in this context refers to the agent's voluntary imposition of a penalty if he acts against the principal's interests (Milgrom & Roberts, 1992, 133). On the other hand, bonding is based on the agent making a monetary deposit, which he forfeits if he acts against the principal's wishes (Milgrom & Roberts, 1992, 189). To limit information asymmetries, screening, signalling, and monitoring can be used. Screening is the process of gathering information about an agent before signing a contract (Stiglitz, 1975). The agent initiates signalling. It aims to send certain credible signals regarding specific activities or personal characteristics to the principal in the form of a self-recommendation (Spence, 1973, 357). The principal observes the agent as part of the monitoring, such as cost accounting and reporting systems (Jensen & Meckling, 1976, 309) (Picot et al., 2008, 79).

According to the principal-agent theory, addressees place a high value on risk reporting in the context of signalling and monitoring to reduce information asymmetries (Dobler et al., 2014, 180). Furthermore, both theoretical and empirical studies show that extensive corporate publicity helps to reduce the cost of capital by increasing recipient confidence in management (Eisenschmidt & Wennekamp, 2014, 478). Moreover, corporate publicity also lowers the risk premium and increases shareholder (Filipiuk, 2009, 98). Against this background, it appears logical that the management, i.e. the agent, strives for high-quality risk reporting to differentiate itself from other competitors for capital in the market (Eisenschmidt & Wennekamp, 2014, 478). However, the publication of competitively sensitive information must be regarded as especially critical from the standpoint of the principal. Against this background, numerous theoretical and empirical studies have discovered that corporations have incentives to present risk-relevant information in a distorted manner (Lackmann et al., 2015, 45) (Velte et al., 2011, 126). As a result, a corporation will only produce high-quality risk reporting if the information benefit outweighs the associated costs (Eisenschmidt & Wennekamp, 2014, 478).

### 3.2. Legal and normative framework

In Germany, the legal and normative framework is divided into mandatory standards imposed by the legislator and additional non-mandatory standards imposed by various institutes. Because the DRS 20 forms a core element of this thesis, a detailed presentation of other standards has been omitted.

#### 3.2.1. The German Legislation

With the introduction of paragraph 91 section, 2 of the German Stock Corporation Act (AktG) within the framework of the Law on Control and Transparency in Business (KonTraG) in 1998, the German legislator for the first time obligated the executive boards of listed corporations to set up an early risk detection and monitoring system (KonTraG, 1998, 787). Furthermore, paragraph 289, section 1 and paragraph 31,5 section 1 of the German Commercial Code (HGB) was expanded by the sub-clause "risks of future development must be addressed" (KonTraG, 1998, 789), which had a significant influence on the management and group management concerning risks. The announcement of the law is thus widely regarded as the birth of risk reporting in Germany (Velte et al., 2011, 132) (Müller et al., 2012, 281). In the years that followed, the legislator continued to expand the obligations for risk reporting: The German Accounting Law Reform Act (BilReG) of 2004 required an expansion of the reporting provision regarding risks in the use of financial instruments in the management report and the business management report under 289 paragraph 2 no. 2 of the HGB (Gesetz Zur Einführung Internationaler Rechnungslegungs-Standards Und Zur Sicherung Der Qualität Der Abschlussprüfung, 2004). In the following years, the obligations concerning risk reporting were continuously expanded by the legislator. In the same year, the German Accounting Law Reform Act (BilReG) required an expansion of the reporting obligation concerning risks in the use of financial instruments according to paragraph 289 section 2 no. 2 HGB in the management report and paragraph 315 section 2 no. 2 HGB in the group management report (Gesetz Zur Einführung Internationaler Rechnungslegungs-Standards Und Zur Sicherung Der Qualität Der Abschlussprüfung, 2004, 3167). In addition, sections 289 paragraph 1 sentence 4 and 315 paragraph 1 sentence 5 of the German Commercial Code (HGB) were amended to include an evaluation and clarification of the key risks in terms of planned growth, as well as the underlying assumptions (Gesetz Zur Einführung Internationaler Rechnungslegungs-Standards Und Zur Sicherung Der Qualität Der Abschlussprüfung, 2004, 3167). The BilReG thus made the purely descriptive explanation, which was sufficient under the KonTraG, invalid. In addition, the reporting obligation in the management report of corporations within the meaning of Section 264d of the German Commercial Code (HGB) was expanded in 2009 as part of the German Accounting Law Modernization Act (BilMoG). Since May 28, 2009, the essential features of the internal control and risk management system concerning the accounting process must be described in this according to paragraph 289 section 5 and paragraph 315 section 2 No. 5 of the German Commercial Code (HGB) (Gesetz Zur Modernisierung Des Bilanzrechts (Bilanzrechts-Modernisierungsgesetz - BilMoG), 2009, 1108). Only the Accounting Directive Implementation Act (BilRUG), which came

into force in 2015, did not have any far-reaching effects on risk reporting (Gesetz Zur Modernisierung Des Bilanzrechts (Bilanzrechts-Modernisierungsgesetz - BilMoG), 2009, 1249)

In recent years, the progression of legislation demonstrates the legislator's efforts to improve the transparency of external risk reporting, especially on the stock market. The German Commercial Code's (HGB) legal standards focus largely on reporting requirements, but they are ambiguous regarding content-related design requirements for external reporting. Furthermore, there is no general obligation to report jointly on the risk management system, the individual risks and the risk situation and methods of a corporation (Lange & Müller, 2009, 282).

### 3.2.2. The DRS 20

Due to the lack of legislative content-related requirements, German corporations currently have a high degree of freedom in risk reporting content (Mühlbauer, 2014, 405). According to paragraph 289 and 315 of the HGB, standards, such as the DRS 20, provide many substantive clarifications of the existing legal basis (Müller et al., 2012, 282). A universal and cross-industrial standard does not exist currently (Filipiuk, 2009, 151).

On the 2<sup>nd</sup> of November 2012, the DRS 20 was removed by the German Account Standards Committee (DRSC) and re-published by the Federal Ministry of Justice (BMJ) on the 4<sup>th</sup> of December 2012 by Section 342 of the German Commercial Code (HGB) (Lackmann et al., 2015, 44). In this way, the DRS 20 standardised and specified the DRSC's previous risk and situation reporting standards and replaced them. (Müller et al., 2012, 283). The management report, as defined in paragraph 264 section 1 and paragraph 290 section 1 of the German Commercial Code (HGB), is an independent information instrument separate from the financial statements, implying that the principles of proper bookkeeping (GoB) do not apply (Dobler et al., 2014). However, as a result of the BMJ's announcement under paragraph 342 section par. 2 of the German Commercial Code (HGB), DRS 20 gains the status of GoB (*Grundsätze ordnungsgemäßer Buchführung*) (Blümle et al., 2013, 271) As a result of this circumstance, the auditor must consider the standards of DRS 20 when auditing risk reports that are part of management reporting (Angermüller & Berger, 2010, 16) The initial mandatory application of the DRS 20 fell on the annual group management reporting of all holding corporations for the 2013 and 2013/14 financial years, respectively, beginning after the 31st of December 2012, whereby an earlier application was recommended (DRSC, 2012, DRS 20.236 and 20.5-9)

The aim of the DRS 20 is to establish principles within the annual report that encourages corporations to "provide information that enables a reasonable reader to obtain a true and fair view of the development and performance of the business and the group's position, the expected development of the group, and the opportunities and risks associated with it." (ibid, DRS 20.3). This situation is to be achieved by implementing a total of 224 DRS 20 standards (cf. ibid., DRS 20.12-K235), which are referred to as rules in the context of the document, for various sub-reports of the management report (ibid, DRS 20.12-K235). The individual standards are based on the six principles of completeness, reliability and balance, clarity and transparency, communication of the group management's view, materiality and gradation of information (ibid, Zusammenfassung). The individual standards distinguish between capital market-oriented corporations and all other corporations (ibid, Zusammenfassung). Furthermore, the standard distinguishes between mandatory standards and recommendations (ibid, Zusammenfassung). The standards for corporations in the credit, finance and insurance sectors are given in separate appendices (ibid, A1.1-22 and A2.1-20). A breakdown of the individual standards of the DRS 20 that explicitly relate to risk reporting is given in the following section.

### 3.3. The DRS 20 Mandatory and Recommendations Standards

Overall, 22 standards of the DRS 20 address the mandatory and recommendations for risk reporting. These can be assigned to the three categories: risk management, individual risks and risk situation (DRSC, 2012, DRS 20.135-164). Within this framework, a large part of the standard falls into the area of individual risks with ten standards (ibid., DRS 20.146-159), followed by nine standards associated with the risk management system (ibid., DRS 20.K137–K145 ) and finally, three standards of the risk situation (ibid., DRS 20.160–164). The remaining two standards provide a reminder that risk reporting must be carried out like all three categories (ibid., DRS 20.135), as well as a link to a separate section containing special criteria for credit and financial processing agencies and insurance providers (ibid., DRS 20.136). In , the DRS 20 standards are listed as mandatory or recommended. provides a summary of the DRS 20's individual mandatory information, guidelines, and additional information in the sense of risk reporting.

The risk management system (2.1) presentation must include its group-wide objectives, strategies, structures, and processes of the risk management system and indicate whether only risks or opportunities are registered (ibid., DRS 20.K137). The standards state in standard 2.2 that the presentation of the risk management framework should enable the recipient to evaluate risk management in the corporate community better

(ibid., DRS 20.K138). Standard 2.3 is all about presenting the risk management system in the annual report of the operations. This standard was divided into two parts: disclosure of the accepted framework concept, disclosure and explanation of risks compared to the previous year, and whether or not risks are generally not recorded or avoided (ibid., DRS 20.K139). The risk management system must state in standard 2.4 "whether and, if so, which risks are not generally recorded or avoided" (ibid., 20.K140). Standard 2.5 addresses the corporate group's principles, rules of conduct, guidelines, and risk-bearing capacity (ibid., DRS 20.K141). After that, the risk consolidation group must be specified in standard 2.6 (ibid., DRS 20.K142). Because this standard is lengthy and complicated when viewed as a one, standard 2.7 has been divided into four segments. These four segments must have the following requirements: a legal or economic group structure, risk management (de)- centralisation, the responsible unit, and materiality thresholds (ibid., DRS 20. K143). Standard 2.8 is all about the risk management process, which is split into three sections: explanation of the identification, assessment, management and control or risk, explanation of international monitoring and whether internal auditing checks the risk management system (ibid., DRS 20. K144). The final standard recommends addressing "the auditor's review of the early risk detection and internal monitoring system by Section 31" (ibid., DRS 20.K138).

The DRSC established the general principle, in the context of reporting on individual risks, that reports must be made on all risks that influence the decision of a reasonable addressee (ibid., DRS 20.146). The first standard recommends that the individual risk should report external and internal risks directly related to the corporation group and its business activities (ibid., DRS 20.147). The 3.2 standard requires identifying significant risks that may threaten the corporation's continued existence (ibid., DRS 20.148). The following standard has been divided into an individual presentation of significant risk and analysis and assessing the expected consequences of those risks (ibid., DRS 20.149). Standards 3.4 and 3.5 of the standards require the presentation of risks and their significance for the corporate group (or significant subsidiaries), as well as the presentation of segments affected by risks if segment reporting is included in the consolidated financial statement (ibid., DRS 20.150) (ibid., DRS 20.151). Standard 3.6 is about risk quantification and is divided into two standards: first, 3.6.1 states that the risks presented must be quantified, and second, 3.6.2 states whether or not the disclosure of information by 20.152 has a significant impact on the corporation group's position (ibid., DRS 20.152) (ibid., DRS 20.153) (ibid., DRS 20.154). Individual risk standard 3.7 requires that the risks be assessed as of the balance sheet date, and any

changes made after the end of the reporting period must also be presented (ibid., DRS 20.155).

Similarly, at least the forecast period must be used to assess the risks. For significant risks, a period of at least one year in the future must be used in standard 3.8 (DRSC, 2012, DRS 20.156). There is a right to choose between gross and net presentation as part of the mandatory presentation and assessment of risk effects as stated in standard 3.9 (DRSC, 2012, DRS 20.157) (ibid., DRS 20.158). Individual risks must be presented and explained in the context of "their significance for the group or significant corporations included in the consolidated financial statements" (ibid., DRS 20.150) and "significant changes in the risks compared to the previous year" (ibid., DRS 20.159).

The third and final category is about the risk situation in the risk reports. In the first standard, 4.1, the standard requires an overall picture of the individual risks being put together into a risk situation, whereby diversification effects can be considered (ibid., DRS 20.160). The standard recommends in section 4.2 that the corporate groups risk-bearing capacity be addressed (ibid., DRS 20.161). The final standard, 4.3, refers to the ranking of individual risks categorising similar risks. This standard was divided into two sections. 4.3.1 requires the aggregated risk situation, which can be either done in a summary or a list (ibid., 20.162). Standard 4.3.2 gives examples for presenting the summary or the list of the aggregated risk situation (ibid., DRS 20.163).

The specifications from the sections internal control system and risk management system related to the group accounting process" (ibid., 20.K168-K178) and "Risk reporting concerning the use of financial instruments" (ibid., DRS 20.179-187) were not taken into account in this investigation because they are chapters that have been separated from the risk report. Similarly, the inclusion of the annexes "Special features of risk reporting by credit and financial services institutions" (ibid., DRS 20.A1.1-A1.22) and "Special features of risk reporting by insurance corporations" (ibid., DRS 20.A2.1-A2.20) were not included in the target concept, because the corporations affected by these specifications were previously excluded from the sample.

The DRS 20 mandatory and recommended standards for the risk report presented in this chapter serve as the foundation for the evaluation model. This investigation is based on and explained in the subsequent chapter.

## **4. Research Methodology and Methods**

The following chapters provide a comprehensive insight into the research methodology, which will underline the study. In the first step, the data basis and its determining

factors are discussed. Subsequently, the content of the DRS 20 as a target benchmark is analysed, and its suitability explained before the valuation model of this study is derived and explained from these findings. The data foundation and its determining factors are discussed in the first step.

#### 4.1. Data foundation

The scope of the study includes the content analysis of the risk reports as part of the annual reports of the listed corporations on the DAX from the year 2020. Before completing the research, five corporations from the credit, financial services, and insurance industries were excluded from the sample because they are less comparable due to additional industry-related standards imposed by the legislature and the DRS 20 (DRSC, 2012, A1.1-22 and A2.1-20). Allianz, Deutsche Bank, Deutsche Börse, and Münchener Rückversicherungsgesellschaft are among the corporations that have been excluded. Furthermore, Delivery Hero is also excluded from the study because they did not provide their annual report when the research was conducted. Overall, this results in a total of 24 risk reports examined.

The selected corporations are divided into seven sectors, with the Transport & Logistics sector accounting for the most corporations (six), followed by the Technology & Telecommunications sector (five). Four corporations are in the Chemistry & Raw Materials sector, and three are in the Pharma & Health sector. Consumer & Fast-Moving Consumer Goods, Energy & Environment, and Real Estate each have two corporations.

All of the 24 corporations from the sample were audited by the audit firms PricewaterhouseCoopers (PwC), Ernst&Young (EY), Deloitte and KPMG. As seen from Table 1, KPMG accounted for ten corporations, followed by PwC with nine engagements, EY with four engagements, and Deloitte with one engagement. A detailed list of the corporations included in the study and their sector category and auditors can be found in the appendix.

The corporations used as the basis for the data were limited to the excluded corporations from the credit, financial services, and insurance sectors to eliminate any potential significant influences associated with index membership in advance. A large portion of previous research found a positive relationship between the quality of reporting and a rising stock market index (Velte et al., 2011, 155) (Mühlbauer, 2014, 7). As a result, a higher quality level can be assumed in this content analysis than subordinate stock market indices. The effects of applying the information grading principle by the DRS 20 are to be avoided by selecting the data basis from an index

(DRSC, 2012, DRS 20.34-35). Because the previously mentioned audit firms audit all DAX 30 corporations, it can be assumed that any impact of audit firm size on reporting quality is minimal. The choice of the reporting period was made due to its current relevance. As a result, the following study examines a data set previously overlooked in research due to its importance. Furthermore, the risk reports examined did not use the DRS 20 standards for the first time. As a result, lower reporting quality in the context of this investigation cannot, as in previous studies, indicate any implementation difficulties and deviations to be expected in the course of new accounting regulations.

Furthermore, the 24 risk reports in the annual reports of the corporations were examined by comparing them to the standards of the criteria catalogue, which will be discussed further in this chapter.

#### 4.2. Analysis of the Suitability of the DRS 20

As mentioned already before, this study aims to present the current state of risk reporting quality. The term quality refers to the degree to which individual risk reports complies with the DRS 20 standards. The suitability of the DRS 20 is first discussed in this chapter, followed by an overview of the content of the relevant figures for the examination.

As part of the management report, the standard's goal is to convey information relevant to decision-making about the course of business, the situation, the expected development, and the associated opportunities and risks (DRSC, 2012, DRS 20.3). The DRS 20 thus requires the disclosure of various information that, if implemented consistently in the context of strategic analysis, can be used as a solid basis by the addressee, even if the specific content remains within the corporation's scope of action (Dobler et al., 2014, 70). As a result, consistent DRS 20 application by reporting entities can increase risk transparency by providing investors with a broader base of risk-related information relevant to their investment decisions. (Filipiuk, 2009, 134). This procedure can be equated with improved reporting quality. A study conducted in the run-up to implementing the DRS 20 standards by Müller/Juchler/Ergün (2012) confirms this assumption.

On the one hand, the standard favours the inflation associated with the expansion of reporting obligations through its available formulation. On the other hand, it addresses this in the context of its materiality principle (DRSC, 2012, DRS 20.32). A review of the use of the different documents and system principles that can be used in preparing the management report revealed that, according to their management report from the previous year, listed corporations place the greatest emphasis on

the DRS 20 (P Kajüter, 2013, 10). Another central selection criterion for the DRS 20 standards as the target benchmark for this study results from the general validity and acceptance of its principles as commonly accepted accounting principles (GoB) under section 342 of the German Commercial Code (HGB). With its first application to financial years after December 31, 2012 (DRSC, 2012, DRS 20.236), the standard achieved the highest level of relevance in Germany, as evidenced by the DPR's designation as an examination subject in 2014 (Ernst, 2015, 11). The DRS 20, issued by the DRSC, forms a strong basis for review as a target criterion for quality evaluation within this study due to its general recognition by both lawmakers and businesses, its topicality, and its positive effect on the quality of financial reporting.

### 4.3. Research Design

A scoring model was used to assess the degree of compliance of the risk reports with the standards of the DRS 20. To that end, a structured evaluation grid in the form of a criteria catalogue was created to serve as the foundation for the content analysis based on the target benchmark (s. Table 7). The individual criteria's were then weighted, which, when multiplied by the corresponding score, resulted in an overall statement about the quality of risk reporting, known as the compliance level. The following section goes over the individual steps and assumptions for the evaluation model (s. Table 7). The criteria catalogue was then compared to each individual risk report from the DAX corporations. The weighting and evaluation process will be discussed in the following chapter.

#### 4.3.1. Evaluation Model

The mandatory standards, recommendations, and additional information identified in chapter 3.3 were transferred into a catalogue of criteria following the DRS 20 in the first step. It was decided to divide the DRS 20 standards into mandatory and recommended standards. A distinction between the overall, mandatory and recommended compliance was added.

DRS 20.135 and DRS 20.136 standards were not included in the evaluation model. According to DRS 20.135, the risk report should include information about the risk management system, individual risks, and the risk situation. (DRSC, 2012, 20.135). These are given in the evaluation model numbers 2.1, 3.1 and 4.1 in . As previously stated, the database excluded standards from the credit, financial services, and insurance industries, so standard 20.136 is unnecessary.

Furthermore, due to a lack of accessibility, the mandatory standards resulting from DRS 20.146 that a report has to be made on all risks that could influence the decision of an informed addressee was excluded from the assessment. The lack of accessibility is based on the fact that no general statement about the decision-making relevance of the information for all addressees can be made. Therefore no clear assessment of this standard can be made.

There are a total of 32 criteria's to be evaluated, with 24 evaluation standards assigned to mandatory information and eight to recommended (s. Table 7). Furthermore, the DRS 20 categorisation was adopted into the three sections: risk management system, individual risks, and risk situation. They were weighted after the individual criteria were established. A weighting comparable to the relative proportion of the evaluation criteria weighted within a category to the total number was performed. An equal weighting of the three categories was not provided in the DRS 20 to account for the unequal distribution of the individual standards and thus an unequal weighting of these categories. Evaluation criteria that require the disclosure of different types of information were further subdivided and weighted so that the overall weighting of the individual sections remained unchanged.

Throughout the examination, the individual criteria were evaluated using a uniform point system based on their degree of fulfilment of the standards derived from the DRS 20. The points were assigned on a scale of 0 to 2, with 2 points awarded if all disclosure standards were met. The corresponding criterion received 1 point if the required information was only partially or insufficiently presented. If no information was provided on the required report content, a score of 0 was assigned. Overall, this results in a maximum number of 34 achievable points in mandatory standards and 44 when all standards and recommendations. To arrive at a final statement about the level of compliance of the corporations and thus obtain a ranking, the weighted points of the individual criteria were added and divided by the number of points obtained. The investigation's findings are presented and explained in greater detail in the following chapter.

## 5. Results of the Investigation

The following chapter will examine the results of the study after examining the risk reports of the DAX30 corporations. The overall database results will be presented first. Following this, the results within the individual assessment categories of the DRS20 are presented and explained in more detail. The assessment categories are the risk management system, individual risks and the risk situation. A detailed overview of the

evaluation of the individual corporations and calculations can be found in the appendix (s. Table 7).

### 5.1. Results of the overall risk reporting of the Corporations

The mandatory and recommended DRS 20 standards for risk reporting presented in this chapter serve as the foundation for the evaluation model described in the following chapter and upon which this investigation is based. Furthermore, assessing the scope, reporting the risk reports in the corporation's annual reports, and their ranking in terms of their degree of compliance is presented. A statement on the overall results of the investigation will follow in this chapter.

When assessing all of the data collected from the risk reports, the average and the median compliance degrees were calculated. For normal number distributions with a small number of outliers, the average is used. In general, the median is used to determine the central tendency of skewed number distributions. Furthermore, based on the data, a compliance rating of two thirds or 66.7 per cent is considered satisfactory.

### 5.2. The formal design of risk reporting

In total, 376 pages of risk reports in the annual reports were analysed, revealing the scope of the risk reporting differently within the DAX 30: the page range of the risk reports ranges from 8 pages at E.ON to 29 pages at the Volkswagen Group. The median of the risk reporting of the analysed corporations is 15 pages.

### 5.3. Compliance distribution and ranking of Corporations

The investigation revealed an overall average compliance degree of 39,52 per cent for the examined corporations with the DRS 20's mandatory and recommended standards as seen in Table 1 - Overall Compliance Percentage and Ranking. As stated in Chapter 5.1, the average was used in this case because the distribution was normal with a low number of outliers.

Corporations	Overall Compliance Percentage	Overall compliance ranking
Adidas	45,70%	8
BASF	31,12%	22
Bayer	44,53%	9
BMW	59,77%	1
Continental	38,28%	16
Covestro	39,19%	7
Daimler	40,10%	14
Deutsche Post	28,91%	23
Deutsche Telekom	43,75%	10
Deutsche Wohnen	27,60%	24
E.ON	36,72%	15
Fresenius	41,41%	12
Fresenius Health Care	48,44%	4
HeidelbergCement	42,97%	11
Henkel	54,17%	3
Infineon Technologies	33,07%	21
Merck	46,35%	6
MTU Aero Engines	36,46%	17
RWE	35,94%	18
SAP	35,16%	19
Siemens	34,37%	20
Siemens Energy	40,89%	13
Volkswagen Group	54,56%	2
Vonowia	48,44%	4
Overall Compliance Median	40,10%	
Overall Compliance Average	39,52%	

Table 1 - Overall Compliance Percentage and Ranking

From Table 1, it *can be seen* that not a single corporation achieved a higher overall compliance degree of 60 per cent. As mentioned in 5.1, the satisfactory compliance degree of 66.7 per cent was not achieved by any stock corporation. BMW achieved the highest level of compliance (59,77per cent), while Deutsche Wohnen achieved the lowest level (27,60per cent). Volkswagen Group and Henkel received higher rankings, both with more than 50per cent. In addition to Deutsche Wohnen, the corporations Deutsche Post, BASF, and Infineon Technologies did not rank higher than 1/3, or 33.33 per cent. Results of the overall risk reporting of the

Corporations	Mandatory Compliance Percentage	Mandatory Ranking
Adidas	45,83%	↑ 6
BASF	28,47%	→ 22
Bayer	39,58%	↓ 12
BMW	59,37%	→ 1
Continental	35,42%	↓ 17
Covestro	34,03%	↓ 18
Daimler	43,06%	↑ 9
Deutsche Post	27,08%	→ 23
Deutsche Telekom	43,75%	↑ 8
Deutsche Wohnen	22,22%	→ 24
E.ON	37,50%	→ 15
Fresenius	41,67%	↑ 10
Fresenius Health Care	54,17%	↑ 2
HeidelbergCement	41,67%	↑ 10
Henkel	52,43%	↓ 4
Infineon Technologies	31,60%	↑ 19
Merck	52,43%	↑ 4
MTU Aero Engines	38,19%	↑ 14
RWE	37,50%	↑ 15
SAP	31,25%	↓ 20
Siemens	31,25%	→ 20
Siemens Energy	38,89%	→ 13
Volkswagen Group	53,47%	↓ 3
Vonovia	45,83%	↓ 6
Overall Mandatory Compliance Median	38,89%	
Overall Compliance Average	38,67%	

Table 2 - Mandatory Compliance Percentage and Ranking

The average mandatory compliance rate is 38.67 per cent, which is lower than the overall compliance rate of all corporations. BMW once again stands out as the corporation with the highest mandatory compliance degree (59,37 per cent). Fresenius Health Care, Volkswagen Group, and Merck are the corporations that trail them in the rankings. Deutsche Wohnen stands out negatively once more, ranking last with 22,22 per cent. Deutsche Post, BASF, SAP, Siemens, and Infineon Technologies were among the lowest scorers, with scores of less than 33 per cent.

Corporations	Recommendation Compliance Percentage	Recommendation Ranking
Adidas	45,31%	↓ 11
BASF	39,06%	↑ 16
Bayer	59,38%	↑ 2
BMW	60,94%	→ 1
Continental	46,88%	↑ 7
Covestro	54,69%	↑ 6
Daimler	31,25%	↓ 20
Deutsche Post	34,38%	↑ 18
Deutsche Telekom	43,75%	↓ 12
Deutsche Wohnen	43,75%	↑ 12
E.ON	34,38%	↓ 18
Fresenius	40,63%	↓ 15
Fresenius Health Care	31,25%	↓ 20
HeidelbergCement	46,88%	↑ 7
Henkel	59,38%	↑ 2
Infineon Technologies	37,50%	↑ 17
Merck	28,13%	↓ 24
MTU Aero Engines	31,25%	↓ 20
RWE	31,25%	↓ 20
SAP	46,88%	↑ 7
Siemens	43,75%	↓ 12
Siemens Energy	46,88%	↑ 7
Volkswagen Group	57,81%	↓ 4
Vonovia	56,25%	↓ 5
Overall Recommendation Median	43,75%	
Overall Compliance Average	42,06%	

Table 3 - Recommendation Compliance Percentage and Ranking

The final table shows the recommended standards compliance ranking of corporations, with BMW scoring the highest percentage with 60,94 per cent. Henkel, Bayer, the Volkswagen Group, Vonovia, and Covestro are the corporations that stand behind the German automaker. The overall recommendation compliance rate was 42,06 per cent.

BMW outperformed all other corporations in terms of overall, mandatory, and recommended compliance degrees. The corporations that stand out negatively in the rankings are Deutsche Wohnen and Deutsche Post. Nonetheless, a pattern can be examined when comparing all three tables together; Neither the mandatory standards nor the recommendations are given greater importance in the risk reports of the

corporations. That is being shown by the fact that many corporations prioritise themselves on the recommendations of the DRS 20 to increase their overall compliance. This is evidenced by the fact that several corporations have used the DRS 20 recommendations to improve their overall compliance, as shown in Table 1 - Overall Compliance Percentage and Ranking and Table 3 - Recommendation Compliance Percentage and Ranking. Corporations that stand out poorly are Deutsche Wohnen, Siemens Energy, Bayer, Continental and SAP. The mentioned corporations jumped an average of 10 rankings when comparing Table 2 - Mandatory Compliance Percentage and Ranking and Table 3 - Recommendation Compliance Percentage and Ranking. This increase can be explained by the fact that corporations use the DRS20 recommended standards to improve their overall compliance level. To avoid a negative difference and slipping in the ranking, corporations that already have a high level of compliance in the mandatory requirements must also maintain their relative quality when applying the recommendations. Corporations such as BMW, Fresenius, Deutsche Telekom, Volkswagen Group, and Vonovia made small jumps in the mandatory and recommendation compliance rankings compared to their overall compliance ranks. When the changes in the rank between mandatory and overall compliance are examined, a homogeneous and balanced picture emerges, which supports the statement that corporations with a high level of mandatory compliance meet this high standard in the recommendations.

The evaluation of the mandatory, recommended and overall compliance, as part of an overall view of the current status quo, lead to a similar picture: not one corporation reached the satisfactory compliance degree of 66,7 per cent or 2/3. The examined DAX 30 corporations failed to disclose investor-relevant information. The results of the associated valuation categories include examining the question of which valuation figure was disclosed to what extent (s. Table 7).

When comparing the corporations' mandatory and recommended degree compliance, it is clear that the corporations place a higher value on the recommended DRS 20 requirements than on the mandatory DRS 20 requirements. In the context of the ranking, however, it can be determined that corporations with a high level of mandatory compliance also implement this high standard when implementing the recommendations of the DRS 20. In particular, BMW, Henkel and the Volkswagen Group stand out positively regarding mandatory, recommended and overall compliance during this investigation.

#### 5.4. Results of reporting in the sectors

In addition to the previous chapter's overall compliance, the corporation sectors were also grouped and examined. The 24 corporations were divided into seven categories: Chemistry & raw materials, consumer & fast-moving consumer goods, energy & environment, pharma & health, real estate, technology & telecommunication and transport & logistics (s. Table 11 - Corporation Sectors **Error! Reference source not found.**). The overall compliance level of each corporation was used to determine the sector's compliance levels. The consumer & fast-moving consumer goods sector, led by Adidas and Henkel, was leading the ranking of the seven sectors since it scored overall compliance of 73 per cent Table 4. The energy and environment sector, which E.ON and RWE represent, was the weakest with 53 per cent. When examining the table, it can be seen that only four out of the seven sectors achieved a higher overall compliance degree than the overall average of 52 per cent.

Number	Corporations	Sector	Auditor	Overall Co	Overall compliance ranking
1.	Adidas	Consumer & Fast-Moving Consumer Goods	KPMG	45,70%	8
2.	BASF	Chemistry & Raw Materials	KPMG	31,12%	22
3.	Bayer	Chemistry & Raw Materials	Deloitte	44,53%	9
4.	BMW	Transport & Logistics	PricewaterhouseCoopers	59,77%	1
5.	Continental	Transport & Logistics	KPMG	38,28%	16
6.	Covestro	Chemistry & Raw Materials	KPMG	39,19%	7
7.	Daimler	Transport & Logistics	KPMG	40,10%	14
8.	Deutsche Post	Transport & Logistics	PricewaterhouseCoopers	28,91%	23
9.	Deutsche Telekom	Technology & Telecommunication	PricewaterhouseCoopers	43,75%	10
10.	Deutsche Wohnen	Real Estate	KPMG	27,60%	24
11.	E.ON	Energy & Environment	PricewaterhouseCoopers	36,72%	15
12.	Fresenius	Pharma & Health	PricewaterhouseCoopers	41,41%	12
13.	Fresenius Health Care	Pharma & Health	PricewaterhouseCoopers	48,44%	4
14.	HeidelbergCement	Chemistry & Raw Materials	PricewaterhouseCoopers	42,97%	11
15.	Henkel	Consumer & Fast-Moving Consumer Goods	PricewaterhouseCoopers	54,17%	3
16.	Infineon Technologies	Technology & Telecommunication	KPMG	33,07%	21
17.	Merck	Pharma & Health	KPMG	46,35%	6
18.	MTU Aero Engines	Transport & Logistics	Ernst & Young	36,46%	17
19.	RWE	Energy & Environment	PricewaterhouseCoopers	35,94%	18
20.	SAP	Technology & Telecommunication	KPMG	35,16%	19
21.	Siemens	Technology & Telecommunication	Ernst & Young	34,37%	20
22.	Siemens Energy	Technology & Telecommunication	Ernst & Young	40,89%	13
23.	Volkswagen Group	Transport & Logistics	Ernst & Young	54,56%	2
24.	Vonovia	Real Estate	KPMG	48,44%	4
	Sector	Number of Corporations in the sectors	Overall Compliance of the Sectors	Overall Compliance Ranking of the Sectors	Overall Medi
1.	Chemistry & Raw Materials	4	39%	4	39%
2.	Consumer & Fast-Moving Consumer Goods	2	50%	1	
3.	Energy & Environment	2	36%	7	
4.	Pharma & Health	3	45%	2	
5.	Real Estate	2	38%	5	
6.	Technology & Telecommunication	5	37%	6	
7.	Transport & Logistics	6	43%	3	

Number	Corporations	Sector	Auditor	Overall Com	Overall compliance ranking
1.	Adidas	Consumer & Fast-Moving Consumer Goods	KPMG	45,70%	8
2.	BASF	Chemistry & Raw Materials	KPMG	31,12%	22
3.	Bayer	Chemistry & Raw Materials	Deloitte	44,53%	9
4.	BMW	Transport & Logistics	PricewaterhouseCoopers	59,77%	1
5.	Continental	Transport & Logistics	KPMG	38,28%	16
6.	Covestro	Chemistry & Raw Materials	KPMG	39,19%	7
7.	Daimler	Transport & Logistics	KPMG	40,10%	14
8.	Deutsche Post	Transport & Logistics	PricewaterhouseCoopers	28,91%	23
9.	Deutsche Telekom	Technology & Telecommunication	PricewaterhouseCoopers	43,75%	10
10.	Deutsche Wohnen	Real Estate	KPMG	27,60%	24
11.	E.ON	Energy & Environment	PricewaterhouseCoopers	36,72%	15
12.	Fresenius	Pharma & Health	PricewaterhouseCoopers	41,41%	12
13.	Fresenius Health Care	Pharma & Health	PricewaterhouseCoopers	48,44%	4
14.	HeidelbergCement	Chemistry & Raw Materials	PricewaterhouseCoopers	42,97%	11
15.	Henkel	Consumer & Fast-Moving Consumer Goods	PricewaterhouseCoopers	54,17%	3
16.	Infineon Technologies	Technology & Telecommunication	KPMG	33,07%	21
17.	Merck	Pharma & Health	KPMG	46,35%	6
18.	MTU Aero Engines	Transport & Logistics	Ernst & Young	36,46%	17
19.	RWE	Energy & Environment	PricewaterhouseCoopers	35,94%	18
20.	SAP	Technology & Telecommunication	KPMG	35,16%	19
21.	Siemens	Technology & Telecommunication	Ernst & Young	34,37%	20
22.	Siemens Energy	Technology & Telecommunication	Ernst & Young	40,89%	13
23.	Volkswagen Group	Transport & Logistics	Ernst & Young	54,56%	2
24.	Vonovia	Real Estate	KPMG	48,44%	4
	Sector	Number of Corporations in the sectors	Overall Compliance of the Sectors	Overall Compliance Ranking of the Sectors	Overall Medi
1.	Chemistry & Raw Materials	4	39%	4	39%
2.	Consumer & Fast-Moving Consumer Goods	2	50%	1	
3.	Energy & Environment	2	36%	7	
4.	Pharma & Health	3	45%	2	
5.	Real Estate	2	38%	5	
6.	Technology & Telecommunication	5	37%	6	
7.	Transport & Logistics	6	43%	3	

Table 4 - Sector Ranking

### 5.5. Results of the reporting in the assessment categories

In terms of the DRS 20, the evaluation model on which this analysis is based was subdivided into three evaluation categories: information on the risk management system, individual risks, and risk situation (s.

Table 10 - Risk Management System, Individual Risks and Risk Situation Compliance Degree4.3.1). Due to the low number of recommendation numbers per evaluation category, this chapter avoided a differentiated consideration of the mandatory and recommended compliance and instead analysed and presented the overall compliance. Table 1 - Overall Compliance Percentage and Ranking depicts the overall compliance evaluation based on the assessment category. The sub-chapters that follow explain the results within the individual evaluation numbers to arrive at a more detailed overall statement about the compliance distribution.

#### 5.5.1. Results of the risk management system requirements

The evaluation of the nine standards of the DRS 20 scores regarding the reporting on the risk management system showed an extremely heterogeneous picture with widespread individual compliance grades per assessment score around the assessment category average of 59 per cent.

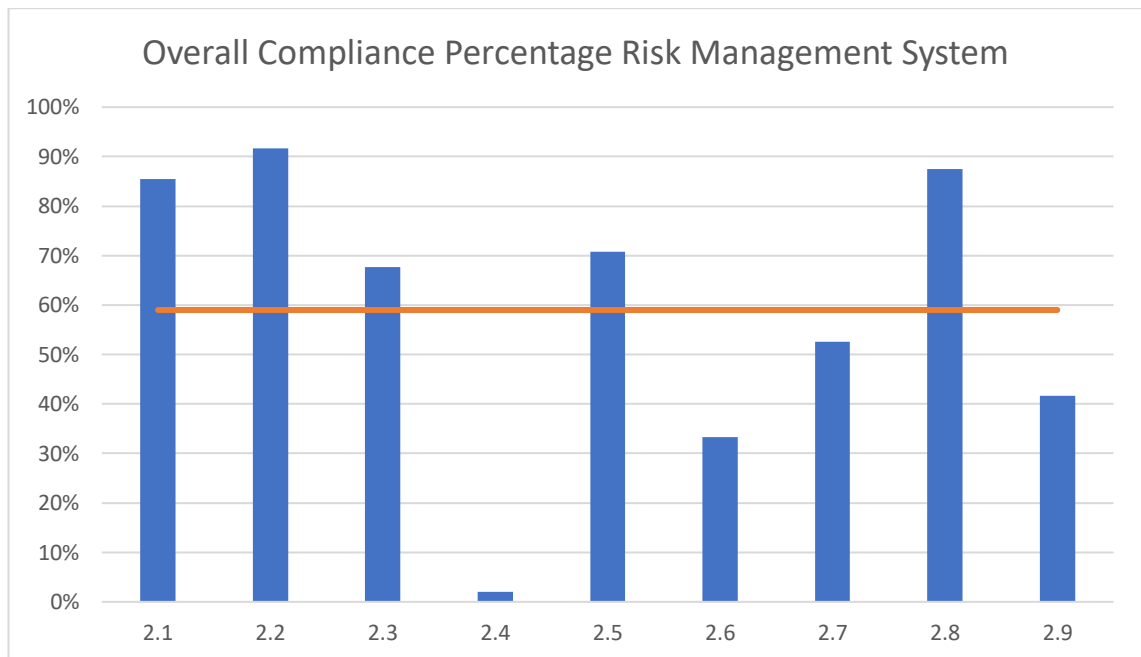


Figure 1 - Risk Management System Compliance Degree

The group-wide risk management system (DRS20 number 2.1) presentation achieved a compliance degree of 85 per cent. The examined corporations did not always state all four: goals, strategies, structures, and processes in their risk management system

section (s. Table 7Table 7). Number 2.2 of the DRS 20 achieved the highest compliance rate out of all section numbers, with a 92 per cent compliance rate. This requirement is notable because all but two corporations (BASF and Deutsche Wohnen) achieved the highest possible score of two points. The following requirement (2.3) had a compliance degree of 68 per cent. The requirement demands the presentation of the risk management system with details about the framework concept and the explanation of significant changes compared to the previous year. Several corporations did not share their changes from the previous year. Most of them stated that they have an approved and respected risk management system framework concept. Only partially one case (s. Table 7Table 7) provided information on whether and which risks were not recorded or avoided, resulting in only a 2 per cent compliance level within the 2.4 requirement. The requirement 2.5. addresses the corporate group's principles, rules of conduct, guidelines, and risk-bearing capacity. It achieved a compliance degree of 34 per cent. The disclosure on the scope of risk consolidation scored 16 per cent compliance. The number 2.7 requirement, on the other hand, received a compliance degree of 53 per cent. The corporations mostly focused on providing information on the risk management (de)-centralisation and the responsible organisational unit in this requirement. The corporations provided information on the alignment of the risk management system with the legal and economic group structure and materiality limits. The information in 2.8.3, if the internal auditing department reviews the risk management system, is particularly noticeable. It was either recorded partially or fully by all of the corporations reviewed. The information in the other sub-numbers (2.8.1 and 2.8.2) to explain risk identification, assessment, management, and control and internal monitoring of these processes were also provided in a disproportionate amount (s. Table 7). The last recommendation about addressing the auditor's review of the early risk detection and internal monitoring system following § 317 (4) of the German Commercial Code (HGB) scored a compliance degree of 42 per cent.

In conclusion, although some of the evaluated DRS20 requirements in the risk management system had an above-average degree, the overall perception of a low category average, which stems from the large range of results in the individual figures, remains. Two deficits in the risk management system sections are presenting which risks are typically not reported or avoided and, secondly, the disclosure of the extent of risk consolidation.

#### 5.5.2. Results of the requirements of the individual risk

The evaluation of the ten requirements of the DRS20 of the individual risks displays a similarly diverse representation as in the previous subchapter's reporting on the risk management system. However, the compliance degree average of the individual risks is slightly higher at 60 per cent (s.

Figure 2 - Individual Risks Compliance

Figure 2 - Individual Risks Compliance). When all three compliance average degrees are being compared, the individual risks are in the middle. The characteristics of the individual risks on the 24 corporations from

Figure 2 - Individual Risks Compliance are presented and explained in greater detail in the following section.

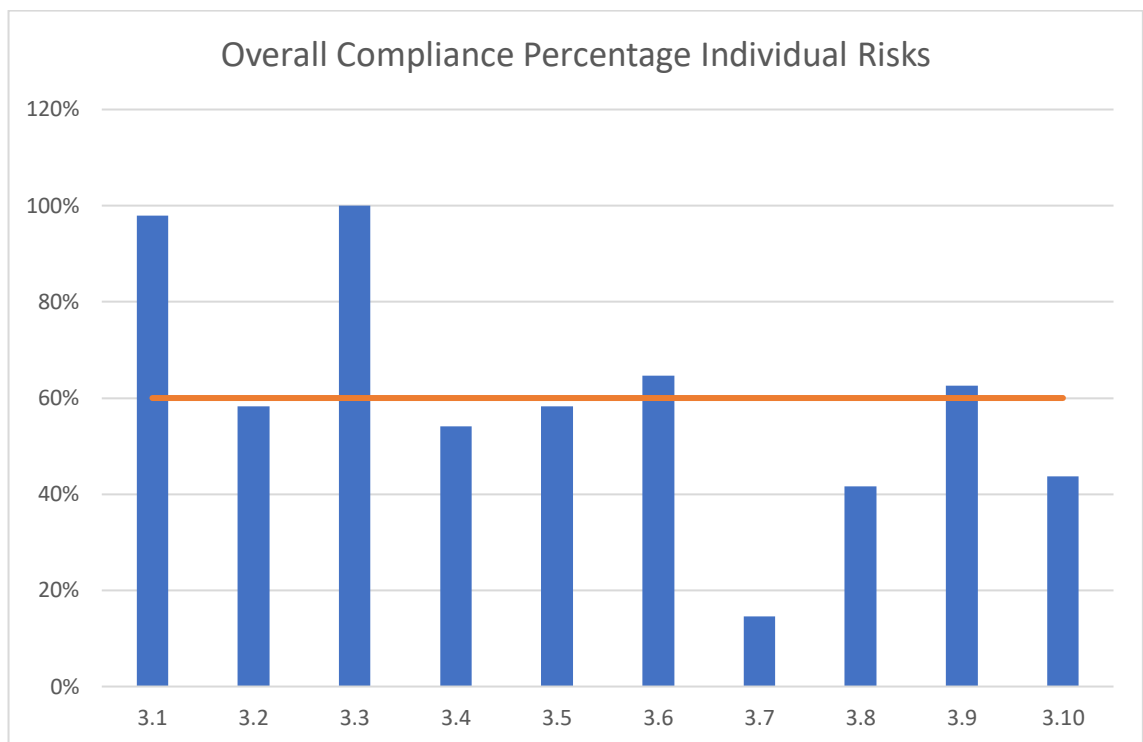


Figure 2 - Individual Risks Compliance

The focus of the first requirement (3.1) of the DRS20 in the individual risks lies in the internal and external risks associated with the corporate group's specific circumstances and business activities. The recommended standard scored an overall 98 per cent compliance degree. The only corporation that did not receive the full score was Merck since the corporation did not focus on their external and internal risks in the chapter. Risks that are likely to jeopardise the corporate group's or a significant subsidiary's existence must be labelled as such; 58 per cent of the corporations did just that (3.2.). Requirement 3.3 was the only standard in the whole study that all corporations

successfully implemented in their risk reports. Every corporation met the requirement with 100 per cent. Standard/requirement 3.4, on the other hand, achieved below-average compliance with a result of 54 per cent.

The presentation of the segments concerned in the case of segment reporting in the consolidated annual report is implemented at a rate of 58 per cent, according to valuation figure 3.5 (s.

#### Figure 2 - Individual Risks Compliance

Figure 2 - Individual Risks Compliance). The overall compliance degree of number 3.5 of the DRS20 had a degree of 65 per cent. However, when the two standards are being broken, two worlds emerge. The standard 3.6.1 scored a compliance degree of 60 per cent, and the 3.6.2 standard only 4 per cent. This result should be critical because the quantified presentation (3.6.1) of essential risks is critical for the individual addressee's risk understanding. As a result, the other 40 per cent of the corporations need to explain the reason for the omission (3.6.2). The overall compliance of this standard was only four per cent. The only corporation that stated that was the German automobile manufacturer BMW. The assessment of risks as of the balance sheet date and information on changes between the balance sheet date and the preparation of the group management report required under 3.7. were only considered with a 15 per cent degree of compliance. Corporations that received 0 in this rating did not provide any information on this point, so there was no clear information base in the addressee's interests. The situation is similar to that of number 3.8, which relates to the assessment period of individual risks. Although more risk reports contained information on this question, achieving a higher compliance level of 42 per cent, the information was also completely missing for several corporations rated 0 in this category (s.

Figure 2 - Individual Risks Compliance Table 7). The required presentation and assessment of the effects of risks in 3.9 were completed with a 63 per cent compliance degree. The final risk presentation compared to the previous year, as required by 3.10, was carried out with a below-average rate of 44 per cent. Almost all of the corporations in this category scored either the full two or no points at all.

Finally, for the evaluation category of the individual risks, it can be stated that the majority of the evaluation numbers were implemented above average from the corporations, resulting in an overall impression of a 60 per cent compliance degree. There were major deficits in the quantification of the risks or a corresponding declaration of negativity (3.6.2) and the inadequate disclosure of changes in the risk assessment between the balance sheet date and the preparation of the management

report (3.7) since it was not properly applied or demonstrated in the risk reports of the corporations Table 7. By raising the individual extreme lows, the overall average could rise significantly and so that previously satisfactory result could be significantly improved.

### 5.5.3. Reporting on the risk situation

Evaluating the last three DRS 20 numbers of the risk situation provided a toned representation of the individual evaluation numbers within this category. The category's compliance average is 83 per cent, which is the highest of the three evaluation categories and significantly higher than the corporation's overall compliance ranking (s.

Table 10 - Risk Management System, Individual Risks and Risk Situation Compliance Degree

Figure 3 - Risk Situation). In comparison to the other categories, the compliance level of the least satisfied rating statistic (74 per cent) is significantly higher than the risk management system (2 per cent) and individual risks (15 per cent ) minimum values (s.

Figure 1 - Risk Management System Compliance Degree,

Figure 2 - Individual Risks Compliance and

Figure 3 - Risk Situation Compliance

Figure 3 - Risk Situation Compliance). The three individual parameters' characteristics

Figure 3 - Risk Situation Compliance are presented and explained in greater detail in the following section.

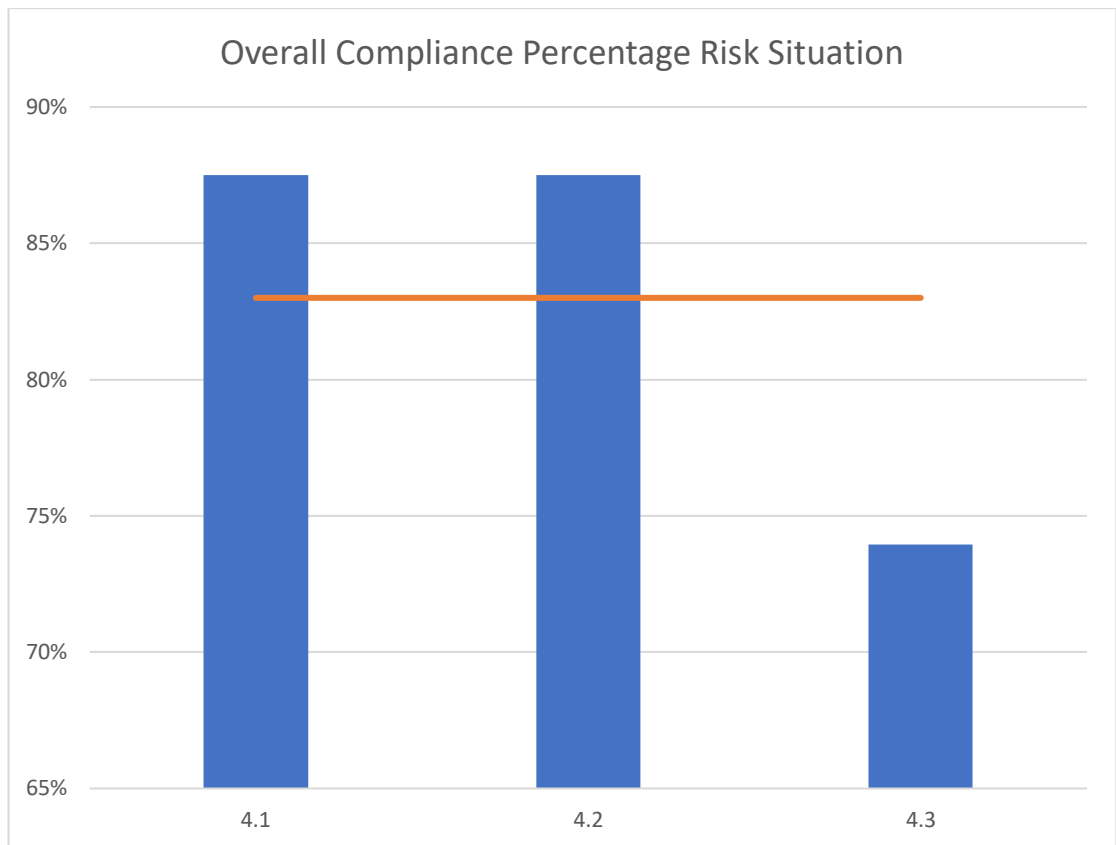


Figure 3 - Risk Situation Compliance

The aggregation of individual risks into an overall picture of the risk situation, as required in 4.1, achieves a very good compliance level of 88 per cent. Only one corporation achieved a score of 0 (Deutsche Telekom), which is very important concerning the importance of an aggregated presentation of the overall risk situation for the recipient. The risk situation contains the risk report's final detail, guiding the recipient in either a good or bad direction. The standard is a recommendation from the DRS20, and the only corporations that did not achieve to score the full points were Adidas, BASF and Deutsche Telekom. The very last standard of the DRS20 4.3 addresses the ranking of individual risk or grouping of similar risk into categories in the risk section achieved the lowest score of 74 per cent between all three standards. In terms of an overall statement on the current state of the DAX 30 risk reporting by the DRS 20 standards, corporations emphasise the aggregated presentation of individual risks in their overall picture of the risk situation. As a result, the corporations provide the most detailed information on this subject. Because the information may be critical to the recipient's understanding of the classification of the severity of the individual risks, this circumstance is to be regarded as critical.

In conclusion, with a very good average result of 83 per cent, the assessment category on the risk situation outperformed the other two categories (s. Figure 1 - Risk Management System Compliance Degree,

Figure 2 - Individual Risks Compliance and

Figure 3 - Risk Situation Compliance). This high score can be attributed to the fact that the range of the results of the individual evaluation figures is smaller than in the other categories. Furthermore, this assessment category consists of only three individual figures, two of which achieve very good compliance grades of twice 88 per cent (s.

Figure 3 - Risk Situation). The only shortcoming here is a failure to consider the ranking of individual risk or grouping similar risk into categories in the risk situation.

In terms of an overall statement on the current state of the DAX 30 risk reporting by the DRS 20, it can be concluded that corporations currently place the greatest emphasis on the aggregated presentation of individual risks in an overall picture of the risk situation. As a result, the corporations report the most in-depth on this topic. More detailed and comprehensive information about the corporations' current risk situation for the respective year could improve the risk situation section.

#### 5.6. Comparison of Results

As previously stated in 2.1, Lackmann's research concluded that the implementation of DRS 20 did not result in the hoped-for improvement in risk and opportunity reporting. According to Lackmann, most businesses have only minimally implemented the requirements (Lackmann et al., 2015, S.48). The decision is very similar after analysing the status quo of Dax companies' risk reports from the year 2020. The mandatory and recommended standards were not met sufficiently by the 24 companies that were investigated as stated in chapter 5. According to Lackmann, the auditors were not sufficiently controlled, as the requirements of DRS 20 were not implemented at all or were only partially implemented in some cases (ibid, 2015, S.48). Because the reports only included a limited amount of information in their risk reports, this can only be an assumption for why the findings were so poor.

According to Lackmann's analysis and the results of the risk reports from the year 2020, the legal requirements of DRS 20 were either not implemented at all or were only partially implemented (ibid, S.48-49). Finally, it may be argued that there is room for improvement in corporations risk reports. It would be preferable to improve the DRS 20 by providing additional examples of application. For example the risk reports of for example BMW, Henkel and the Volkswagen Group could serve as a model for other

corporate groups in the future. Their risk reporting provided information in a clear and concise manner as seen in Table 7. Furthermore, the use of tables and graphics made the required information easier to understand for stakeholders, resulting in less information overload.

## 6. Critical Appraisal

The hypotheses and methods upon which this analysis is focused have certain shortcomings in their insightful importance about the DAX 30 risk reporting accuracy. It should be noted that only the external risk reports published by the corporations from the management report could be examined. Although information can be derived from representations in risk reports in many places, a targeted distortion of the information presented using the principal-agent problem cannot be checked during this investigation. In an overall statement, it cannot be determined with certainty whether the corporation provides the addressee with all relevant information to his or her decision and whether the compliance degree used as a threshold value for assessing good compliance applies to all addressees. Furthermore, the insightful usefulness of this analysis is constrained since it only considered a one-period reporting period. Due to different index compositions, sample sizes, and assessment models, the findings cannot be compared with previous studies without qualifying them. When viewed individually, the underlying evaluation model not only makes comparisons with previous studies difficult but is also subject to a high degree of subjectivity. Even though the catalogue of criteria was derived from a general standard, the derivation of the individual evaluation numbers and their weighting was justified, albeit not without subjective influences.

Similarly, information from risk assessments cannot be collected and evaluated without any degree of subjectivity. Finally, the study's clear assumption is that an increase in compliance due to increased risk publicity by corporations has a positive effect on the recipient's decision-making situation is only valid to a certain extent.

In conclusion, it can be stated that the informative value of this study, taking into account the deficiencies in the sole evaluation of external risk reporting, objectivity, and the exclusion of an "information overload," can be weighed. However, it essentially satisfies the claim to provide an overview of the current status quo of risk reporting by DAX 30.

## 7. Conclusion

The state of the DAX 30's risk reporting quality from the fiscal year 2020 can be described as inadequate, with a degree of 39,42 per cent. One possible explanation for the lack of information relevant to decision-making is that the corporations concerned are concerned that publication will harm their competitiveness (Velte et al., 2011, 164). A ranking of the examined corporations based on their compliance level demonstrates the heterogeneity of the current reporting quality concerning the DRS 20 requirements. In this context, BMW, Henkel and the Volkswagen Group stand out as positive outliers, while Deutsche Wohnen and the Deutsche Post stand out as negative outliers. Only the poor result in risk management system reporting deviates from the results of previous individual studies (Filipiuk, 2009, 248), which can be explained by the differences in requirements of DRS 20 and its predecessor versions, as well as different evaluation models.

According to the DRS 20, the goal of risk reporting is to provide the recipient with decision-relevant information on the risk management system, individual risks, and the risk situation of the corporate group, which can be used as a solid foundation for strategic analysis (DRSC, 2012, DRS 20.3). According to the findings of this report, this target appears to have been met only to a small degree, and a few significant deficits indicate significant room for progress. After its initial public appearance in 2012, the DRS20 demonstrated that standards like these could be fundamentally suitable for improving the quality of risk reporting. Against this background, it should be noted that the specific content design remains within the scope of the corporation's action and that targeted distortions can sometimes not be understandable to the addressee. As a result, it is up to the auditor to evaluate the corporation's justifications for external and internal risk reporting differences (Müller et al., 2012, 286). Nonetheless, a continuation of the research to evaluate the implementation practice is needed in this context, as it highlights important findings of formulation deficits and potential for improvement within DRS 20.

Furthermore, the adoption of new national and international norms must be monitored and their consequences evaluated. Comparing the DRS 20 with approaches from other countries may also provide valuable impetus for raising the standard. Against this background, it is necessary to investigate whether the requirement to disclose information about the risk management system, as prescribed in the DRS 20, should only affect capital market-oriented corporations. The implementation of the DRS 20 requirements for forecast and opportunity reporting, which is frequently associated with

the risk report, must be further examined in the future in order to subsequently examine the extent to which integration of these reports can increase reporting quality. Finally, it is worth noting that reporting in the context of the Principal-Agent-Problem represents only one solution among many. Implementing additional measures, such as clauses in capital-transfer contracts (Filipiuk, 2009, 113), must be evaluated regarding their usefulness and potential synergy effects for monitoring through reporting.

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Num	Individual criteria of the DRS 20 (DRS 20.135-164)	Priority	Number in the DRS	Weight	Mac Score of Weihin
1.	<b>Formal structure of the risk report</b>				
1.1	Report form (separate / joint reporting with opportunities; separation of / integration in forecast report)	Supplementary	K117		
1.2	Scope of risk reporting (number of pages in the risk report)	Supplementary	K117		
2.	<b>Risk Management System</b>		K137-K145		
2.1	Presentation of the characteristics of the group-wide risk management system	Mandatory	K137		
2.1.1	Presentation of objectives, strategies, structures and processes	Mandatory	K137	0,50	1
2.1.2	Indication of whether risks or also opportunities are recorded	Mandatory	K137	0,50	1
2.2	The presentation of the risk management system should enable the recipient to better assess the handling of risks in the corporate group	Mandatory	K138	1,00	2
2.3	Presentation of risk management system:	Mandatory	K139		
2.3.1	Disclosure of generally accepted framework concept	Mandatory	K139	0,50	1
2.3.2	Disclosure and explanation of significant changes compared to the previous year	Mandatory	K139	0,50	1
2.4	Indication of whether and, if applicable, which risks are generally not recorded or avoided	Mandatory	K140	1,00	2
2.5	Addressing the principles, rules of conduct, guidelines and risk-bearing capacity of the corporate group	Recommendation	K141	1,00	2
2.6	Disclosure of the scope of risk consolidation if it differs from the scope of consolidation in the consolidated financial statements	Mandatory	K142	1,00	2
2.7	Addressing the alignment of the risk management system	Recommendation	K143		
2.7.1	Legal or economic group structure	Recommendation	K143	0,25	0,5
2.7.2	(De-)Centralisation of Risk Management	Recommendation	K143	0,25	0,5
2.7.3	Responsible organisational unit	Recommendation	K143	0,25	0,5
2.7.4	Materiality thresholds	Recommendation	K143	0,25	0,5
2.8	Presentation of risk management processes	Mandatory	K144		
2.8.1	Explanation of the identification, assessment, management and control of risks	Mandatory	K144	0,33	0,666667
2.8.2	Explanation of internal monitoring of these processes	Mandatory	K144	0,33	0,666667
2.8.3	Indication of whether internal auditing checks the risk management system	Mandatory	K144	0,33	0,666667
2.9	Addressing the auditor's review of the early risk detection and internal monitoring system in accordance with § 317 (4) of the German Commercial Code (HGB)	Recommendation	K145	1,00	2

3.	Individual Risks - Reporting on risks that have an influence on the decision of a reasonable recipient	Mandatory	146-159		
3.1	The risks associated with the specific circumstances of the corporate group and its business activities form the focus of the reporting and include external as well as internal risks	Recommendation	K147	1,00	2
3.2	Risks, the occurrence of which would probably jeopardise the existence of the corporate group or a significant subsidiary, must therefore be designated as such	Mandatory	K148	1,00	2
3.3	Significant risks	Mandatory	K149		
3.3.1	Individual presentation of the significant risks	Mandatory	K149	0,50	1
3.3.2	Analysis and assessment of the expected consequences	Mandatory	K149	0,50	1
3.4	The presentation of the risks must show their significance for the corporate group or significant subsidiaries.	Mandatory	K150	1,00	2
3.5	Presentation of segments affected by risks if the consolidated financial statements include segment reporting	Mandatory	K151	1,00	2
3.6	Risk quantification	Mandatory	K152/K153/K154		
3.6.1	The risks presented must be quantified if this is also done for internal control purposes and the quantitative information is material for the recipient. In this case, internally determined values are to be stated and the models used and their assumptions are to be presented and explained	Mandatory	K152/K153/K154	0,50	1
3.6.2	If the disclosure of the information according to DRS 20.152 significantly affects the position of the group (e.g. in the context of a legal dispute), quantification of the risks can be dispensed with. In this case, the reasons for the omission must be presented	Mandatory	K152/K153/K154	0,50	1
3.7	Assessment of the risks as of the balance sheet date; if risks arise afterwards, no longer apply or their meaning changes, the changed assessment must also be presented	Mandatory	K155	1,00	2
3.8	The assessment period for the individual risks must at least correspond to the forecast period; an assessment period of at least one year must be used as a basis for risks that endanger the existence of the company	Mandatory	K156	1,00	2
3.9	Presentation and assessment of the effects of risks; Choice between: Gross view: presentation of risks before countermeasures to limit the risk as well as measures themselves Net view: presentation of risks after implementation of risk limitation measures If risks are considered that affect balance sheet items (income perspective), a balance sheet Provision (e.g. write-offs, formation of reserves ...) be a risk limitation measure. For risks that affect the Group's cash flows (financial perspective), a financial provision does not represent a risk limitation measure within the meaning of Item 157.	Mandatory/Additional	K157/K158	1,00	2
3.10	Presentation and explanation of significant changes in risks compared to the previous year	Mandatory	K159	1,00	2
4.	Risk situation		K160-K164		
4.1	Aggregation of the individual risks into an overall picture of the risk situation - Diversification effects can be taken into account	Mandatory	K160	1,00	2
4.2	Addressing the risk-bearing capacity of the corporate group	Recommendation	K161	1,00	2
4.3	Ranking of individual risks or Grouping of similar risks into categories	Mandatory/Additional	K162/K163/K164		
4.3.1	Ranking: Presentation of risks according to their relative importance (likelihood of occurrence x possible impact) on target achievement.	Mandatory/Additional	K162/K163/K164	0,50	1
4.3.2	Categories: Example categorisation: environmental risks, industry risks, performance risks, financial risks, other risks (based on internal categorisation).	Mandatory/Additional	K162/K163/K164	0,50	1

Table 7 - Individual DRS 20 Standards

Qualif Benchmark	Cor	Address	BASF	Bayer	BMW	Comment	Coestric	Daniel	Deutsche	Deutsche	Deutsche	E.ON	Fresenius	Fresenius	Heidelberg	Hertel	Infragon	Merck	MTU Aer	RWE	SAP	Siemens	Siemens	Volkswagen	Vonovia
Planzation	Nun Weig	Score Weig	Score Weig	Score Weig	Score Weig	Cont Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig	Score Weig
Mandatory	2.11	0.50	2	1	0.5	2	1	0.5	2	1	0.5	2	1	0.5	2	1	0.5	2	1	0.5	2	1	0.5	2	1
Mandatory	2.12	0.50	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mandatory	1.00	2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mandatory	2.31	0.50	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mandatory	2.32	0.50	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	2.4	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recommendation	2.5	1.00	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mandatory	2.6	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recommendation	2.7	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recommendation	2.7.1	0.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recommendation	2.7.2	0.25	2	0.5	1	0.25	2	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recommendation	2.7.3	0.25	2	0.5	1	0.25	2	0.5	2	0.5	2	0.5	2	0.5	2	0.5	2	0.5	2	0.5	2	0.5	2	0.5	2
Recommendation	2.7.4	0.25	1	0.25	1	0.25	2	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	2.8	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	2.8.1	0.33	2	0.67	1	0.33	2	0.67	1	0.33	2	0.67	1	0.33	2	0.67	1	0.33	2	0.67	1	0.33	2	0.67	1
Mandatory	2.8.2	0.33	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2
Mandatory	2.8.3	0.33	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2	0.67	2
Recommendation	2.9	1.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Recommendation	3.1	1.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mandatory	3.2	1.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mandatory	3.3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	3.3.1	0.50	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mandatory	3.3.2	0.50	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mandatory	3.4	1.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mandatory	3.5	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	3.6	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	3.6.1	1.00	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mandatory	3.6.2	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	3.7	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	3.8	1.00	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	3.9	1.00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	3.10	1.00	2	2	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mandatory	4.1	1.00	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Recommendation	4.2	1.00	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mandatory	4.3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mandatory	4.3.1	0.50	2	1	1	0.5	0	0	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mandatory	4.3.2	0.50	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Max	Max	Addr	BAS	Bea	BMW	Cont	Coer	Dam	Deut	Deut	Deut	E.ON	Fes	Fes	Heid	Her	Infr	Mer	MTU	RWE	SAP	Siem	Siem	Volk	Vono
Mandatory	48	17	22	13.7	19	28.5	17	16.3	20.7	13	21	10.7	18	20	26	20	25.2	15.2	25.2	18.3	15	15	18.7	25.7	22
Recommendation	16	5.25	7.25	6.25	9.5	9.75	7.5	8.75	5	5.5	7	7	5.5	6.5	5	7.5	9.5	6	4.5	5	7.5	7	7.5	9.25	9
Sum	64	22.2	29.2	19.9	28.5	38.2	24.5	25.1	25.7	18.5	28	17.7	23.5	26.5	31	27.5	34.7	21.2	29.7	23.3	23	22.5	22	26.2	31

Table 8 - Weighted Standards for risk reporting by the DRS 20

Corporations	Overall Compliance Percentage	Overall compliance ranking
Adidas	45,70%	8
BASF	31,12%	22
Bayer	44,53%	9
BMW	59,77%	1
Continental	38,28%	16
Covestro	39,19%	7
Daimler	40,10%	14
Deutsche Post	28,91%	23
Deutsche Telekom	43,75%	10
Deutsche Wohnen	27,60%	24
E.ON	36,72%	15
Fresenius	41,41%	12
Fresenius Health Care	48,44%	4
HeidelbergCement	42,97%	11
Henkel	54,17%	3
Infineon Technologies	33,07%	21
Merck	46,35%	6
MTU Aero Engines	36,46%	17
RWE	35,94%	18
SAP	35,16%	19
Siemens	34,37%	20
Siemens Energy	40,89%	13
Volkswagen Group	54,56%	2
Vonovia	48,44%	4
Overall Compliance Median	40,10%	
Overall Compliance Average	39,52%	

Corporations	Mandatory Compliance Percentage	Mandatory Ranking
Adidas	45,83%	6
BASF	28,47%	22
Bayer	39,58%	12
BMW	59,37%	1
Continental	35,42%	17
Covestro	34,03%	18
Daimler	43,06%	9
Deutsche Post	27,08%	23
Deutsche Telekom	43,75%	8
Deutsche Wohnen	22,22%	24
E.ON	37,50%	15
Fresenius	41,67%	10
Fresenius Health Care	54,17%	2
HeidelbergCement	41,67%	10
Henkel	52,43%	4
Infineon Technologies	31,60%	19
Merck	52,43%	4
MTU Aero Engines	38,19%	14
RWE	37,50%	15
SAP	31,25%	20
Siemens	31,25%	20
Siemens Energy	38,89%	13
Volkswagen Group	53,47%	3
Vonovia	45,83%	6
Overall Mandatory Compliance Median	38,89%	
Overall Compliance Average	38,67%	

Corporations	Recommendation Compliance Percentage	Recommendation Ranking
Adidas	45,31% ↓	11
BASF	39,06% ↑	16
Bayer	59,38% ↑	2
BMW	60,94% →	1
Continental	46,88% ↑	7
Covestro	54,69% ↑	6
Daimler	31,25% ↓	20
Deutsche Post	34,38% ↑	18
Deutsche Telekom	43,75% ↓	12
Deutsche Wohnen	43,75% ↑	12
E.ON	34,38% ↓	18
Fresenius	40,63% ↓	15
Fresenius Health Care	31,25% ↓	20
HeidelbergCement	46,88% ↑	7
Henkel	59,38% ↑	2
Infineon Technologies	37,50% ↑	17
Merck	28,13% ↓	24
MTU Aero Engines	31,25% ↓	20
RWE	31,25% ↓	20
SAP	46,88% ↑	7
Siemens	43,75% ↓	12
Siemens Energy	46,88% ↑	7
Volkswagen Group	57,81% ↓	4
Vonovia	56,25% ↓	5
Overall Recommendation Median	43,75%	
Overall Compliance Average	42,06%	

Table 9 - Compliance Degree of Corporations



Figure 4 - Overall, Mandatory, Recommended Compliance Graphs

	Max Score Mandatory	Max Score Recommendation	Max Score Combination of Mandatory & Recommendation		Number	Overall Compliance	Overall Compliance Percentage
Management	12	6	18		2.1	41	85%
Individual Risks	18	2	20		2.2	44	92%
Risk Situation	4	2	6		2.3	32,5	68%
					2.4	1	2%
					2.5	34	71%
					2.6	16	33%
					2.7	25,25	53%
					2.8	42	87%
					2.9	20	42%

Number	Overall Compliance	Overall Compliance Percentage	Number	Overall Compliance	Overall Compliance Percentage
3.1	47	98%	4.1	42	88%
3.2	28	58%	4.2	42	88%
3.3	48	100%	4.3	35,5	74%
3.4	26	54%			
3.5	28	58%			
3.6	31	65%			
3.7	7	15%			
3.8	20	42%			
3.9	30	63%			
3.10	21	44%			

Table 10 - Risk Management System, Individual Risks and Risk Situation Compliance Degree

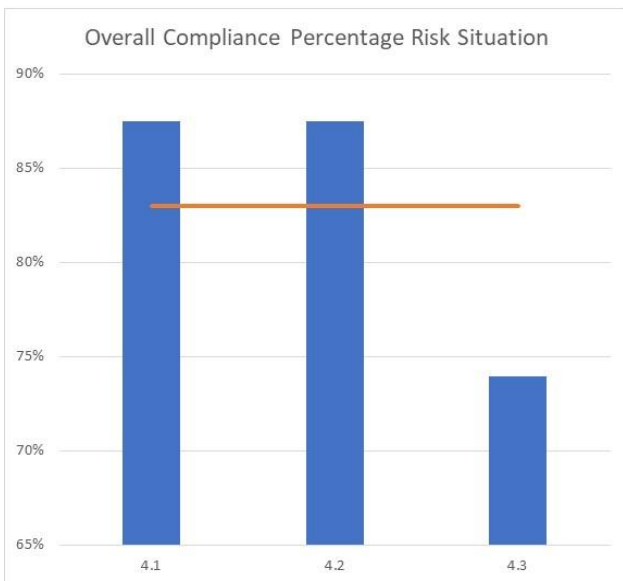


Figure 5 - Compliance Degree Percentage of three Categories

Number	Corporations	Sector	Auditor	Overall Compliance of the Sectors	Overall Compliance Ranking of the Sectors	Overall compliance ranking
1.	Adidas	Consumer & Fast-Moving Consumer Goods	KPMG	45,70%	8	22
2.	BASF	Chemistry & Raw Materials	KPMG	31,12%	9	22
3.	Bayer	Chemistry & Raw Materials	Deloitte	44,53%	9	9
4.	BMW	Transport & Logistics	PricewaterhouseCoopers	59,77%	1	1
5.	Continental	Transport & Logistics	KPMG	38,28%	16	16
6.	Covestro	Chemistry & Raw Materials	KPMG	39,19%	7	7
7.	Daimler	Transport & Logistics	KPMG	40,10%	14	14
8.	Deutsche Post	Transport & Logistics	PricewaterhouseCoopers	28,91%	23	23
9.	Deutsche Telekom	Technology & Telecommunication	PricewaterhouseCoopers	43,75%	10	10
10.	Deutsche Wohnen	Real Estate	KPMG	27,60%	24	24
11.	E.ON	Energy & Environment	PricewaterhouseCoopers	36,72%	15	15
12.	Fresenius	Pharma & Health	PricewaterhouseCoopers	41,41%	12	12
13.	Fresenius Health Care	Pharma & Health	PricewaterhouseCoopers	48,44%	4	4
14.	HeidelbergCement	Chemistry & Raw Materials	PricewaterhouseCoopers	42,97%	11	11
15.	Henkel	Consumer & Fast-Moving Consumer Goods	PricewaterhouseCoopers	54,17%	3	3
16.	Infraneon Technologies	Technology & Telecommunication	KPMG	33,07%	21	21
17.	Merck	Pharma & Health	KPMG	46,35%	6	6
18.	MTU Aero Engines	Transport & Logistics	Ernst & Young	36,46%	17	17
19.	RWE	Energy & Environment	PricewaterhouseCoopers	35,94%	18	18
20.	SAP	Technology & Telecommunication	KPMG	35,16%	19	19
21.	Siemens	Technology & Telecommunication	Ernst & Young	34,37%	20	20
22.	Siemens Energy	Technology & Telecommunication	Ernst & Young	40,89%	13	13
23.	Volkswagen Group	Transport & Logistics	Ernst & Young	54,56%	2	2
24.	Vonovia	Real Estate	KPMG	48,44%	4	4
Sector		Number of Corporations in the sectors	Overall Compliance of the Sectors	Overall Compliance Ranking of the Sectors	Overall Median	Overall Median
1.	Chemistry & Raw Materials	4	39%	4	39%	
2.	Consumer & Fast-Moving Consumer Goods	2	50%	1		
3.	Energy & Environment	2	36%	7		
4.	Pharma & Health	3	45%	2		
5.	Real Estate	2	38%	5		
6.	Technology & Telecommunication	5	37%	6		
7.	Transport & Logistics	6	43%	3		

Table 11 - Corporation Sectors

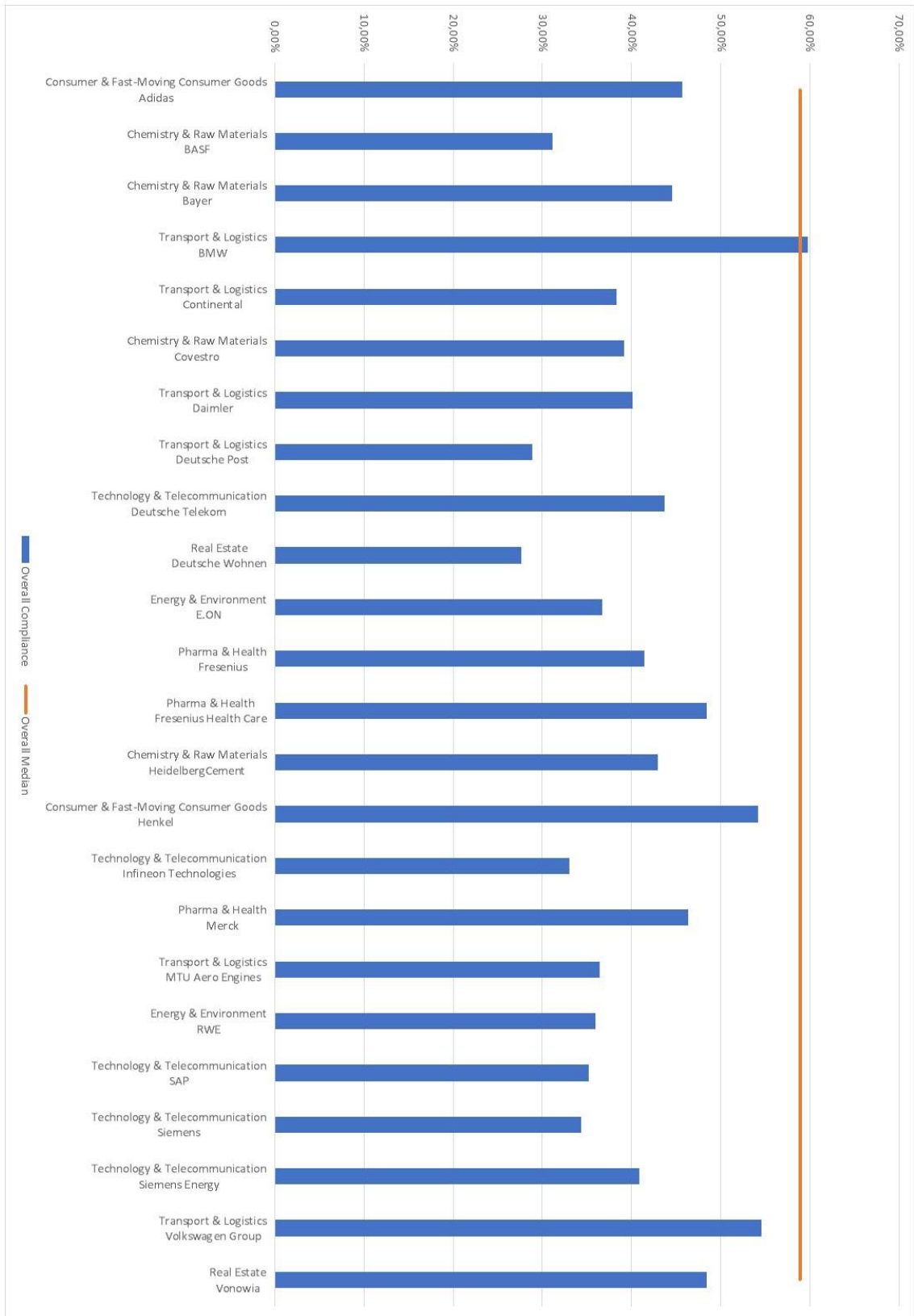


Figure 6 - Sector & Corporations Compliance Degree Graph