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CSR reports: a strategic tool

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Abstract

This study investigates whether a positive tone in Corporate Social Responsibility (CSR) reports is implemented with the goal to greenwash earnings management, a result previously found on this topic (e.g., Li et al, 2023). This study uses a novel approach, typically not used in this field, to study this topic. Agglomerative hierarchical cluster analyses are conducted using two proxies for greenwashing, sentiment scores provided by the dictionary of Loughran and McDonald (2011), and the Modified Jones Model (Dechow, 1995) to proxy earnings management. By using ESG data to proxy greenwashing, this study found that there were only few companies that employ a positive tone as a strategy to greenwash earnings management in a sample consisting of companies from Europe.

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1 Introduction

Over the last few years, the usage of Corporate Social Responsibility (hereafter CSR) reporting has increased (Tschopp & Huefner, 2015). However, it is still in its infancy when compared to how financial reporting has developed. CSR reports in addition to financial reports are currently used by investors for making investment decisions. Information on sustainability-related risks is considered decision-useful because it informs investors about the performance of a company and its future. Because there is a lack of guidelines and standards for creating CSR reports, the International Financial Reporting Standards (IFRS) foundation created the International Sustainability Standards Board (ISSB). The standards provided by the ISSB will provide capital market participants with decision-useful information on sustainability-related risks (Haji et al., 2022). These standards are expected to help CSR reporting to grow out of its infancy.

Different theories in the field of financial accounting discuss the purposes for which CSR reports are used by companies. One of these is the legitimacy theory. This theory suggests that companies use CSR reporting to legitimize their operations by providing a sustainability disclosure (Deegan, 2002). According to this theory, companies try to alter the public perception of their sustainability performance. This implies a negative use of CSR reporting. An example from prior research are sin industries, an industry with a bad public perception, that according to the scholars who performed research on the topic, use CSR not only to legitimize their position to the public but also to avoid getting in trouble with the authorities (Dhandhanian & O'Higgins, 2022). Another theory that aims to explain reporting behaviour by companies is the voluntary disclosure theory or signalling theory. This theory implies that companies use CSR reporting to strengthen their position relative to their competitors. This implies a positive use of CSR reporting. By disclosing high quality CSR reports they show their superiority when compared to other firms, regarding their CSR reporting practice. Hummel et al. (2016) suggest contrary to previous research, that legitimacy theory and voluntary disclosure theory are two sides of the same coin, implying that both perspectives can be used to describe the phenomenon, but do not exclude one another. Companies want to disclose CSR reports, even when they are performing badly. However, the quality of the report will be much lower compared to a company that is performing well regarding CSR. Building on the legitimacy theory and the voluntary disclosure theory, Michelon et al. (2015)

suggest that CSR reports are used symbolic rather than substantively. When CSR is used symbolically, companies use CSR as a tool to portray themselves as being genuinely committed to CSR. However, organizational activities are, in that case, not really aligned to social norms. A substantive approach implies that a company actually aligns organizational processes and strategies with social norms. Therefore, the company provides an honest depiction of itself in a CSR report.

While research exists on why firms would use CSR reporting, Bebbington et al. (2014) argues that research has not yet found a theory that accurately represents the reporting behaviours of firms. However, it is important to know why companies use CSR reporting as a strategic tool (Khan et al., 2020), because CSR is currently mainly being viewed as a strategic issue (Zerbini, 2017). Considering the significant time and resources invested in strategic implementation of CSR, the strategic interest to CSR by companies needs to be addressed by researchers (Bansal et al., 2015). The strategic implementation of CSR is of importance to achieving the goals of the company just like any other strategy (Fatima & Elbanna, 2022). Ndzibah (2009) provides insights in CSR being used as a strategic tool in two ways: as a trick or as a treat. When used as a trick, there is malicious intent by the provider of the CSR report. The reported information is used to fool the reader. This relates to the legitimacy theory and CSR being used symbolically. When used as a treat, CSR reports are a way of informing the reader by making them aware of certain conditions and situations, which relates to the voluntary disclosure theory.

An attempt to further refine the existing theory was made by Li et al. (2023). They presented an argument that states that CSR reports are used for greenwashing, and more specifically, to cover up earnings management. They found that a positive relationship exists between the tone of a CSR report and earnings management in China. While they argue that the positive tone is applied to mask earnings management, the paper fails to provide proof of the CSR reports actually being used for greenwashing instead of other strategic objectives. Their conclusion is based on prior research on CSR reporting being used for corporate image management. They state that China does not yet have penalties implemented for firms that fail to comply with mandatory reporting requirements and therefore listed firms have motivations and opportunities to use CSR reporting as a method to mask their earnings management.

To build on the basis established by Li et al., the aim of the study is to test their findings using a different method to see whether the positive tone is used in CSR reports to greenwash earnings management. The research question that is formulated to study this topic is as follows:

RQ: Is a positive tone used in CSR reports as a strategic tool to greenwash earnings management?

The research has the following theoretical contributions. First, it contributes to the debate on the motivations behind how companies use CSR, by providing empirical evidence on the usage of CSR as a strategic tool for greenwashing (Khan et al., 2020). Through testing the results of Li et al. (2023), the research contributes to the literature that tries to confirm reporting behaviours (Bebbington et al., 2014). Using the method of a cluster analysis, the research provides insights into the behavioural patterns of managers regarding the usage of CSR disclosures.

Second, by using multiple proxies for greenwashing the research provides a comparison of methods for the measurement of greenwashing. Currently, there is a lack of a sophisticated measurement method for greenwashing. De Freitas et al. (2020) called for a focus of future research on developing methods that are more capable at detecting greenwashing. The usage of two proxies contributes to the literature on greenwashing by looking at how much the proxies differ when used to explain greenwashing used in CSR disclosures.

Third, by trying to confirm the results of Li et al. (2023), the study further supplements the literature on the driving factors of reporting tone, including misleading investors (Delmas & Burbano, 2011, Huang et al., 2014). By researching the relation between reporting tone of CSR disclosures and greenwashing, the study supplies the development of textual analysis in accounting.

The research has the following practical implications. Intermediaries providing assurance must be able to verify disclosed non-financial information. The provided insights assist in identifying potential greenwashing. Investors are inclined to make well-informed decisions before deciding to invest in a company. Therefore, they must analyse the non-financial information next to the financial information. The textual information analysis enables the investors to effectively

evaluate the company on non-financial information. Therefore, they are less likely to make a risky investment.

The setup of the thesis is as follows: Section 2 goes into the literature regarding CSR reporting being used as a strategic tool. Section 3 contains the methodology used to conduct the research. Furthermore, section 4 provides the results. Lastly, section 5 provides a conclusion with discussion.

2 Literature Review

The underlying motivations for the usage of Corporate Social Responsibility (CSR) reports have not yet been confirmed by researchers and are still up for debate (Bebbington et al., 2014). This section touches upon the existing literature of CSR reports as a strategic tool and gives an overview of where the literature stands today.

2.1 CSR reports as a strategic tool

The purpose of CSR reports is to provide its readers with decision useful information regarding social and sustainability related matters. Even though that should be the intended purpose and while CSR disclosure is more extensive today, researchers have argued that CSR disclosure fails to provide relevant information for the assessment of firm value (Cho et al., 2015).

The legitimacy theory has been used frequently to describe the intentions of companies that report on CSR. The theory implies that companies intent to legitimize their operating activities by disclosing CSR reports, which positively influence the public perception of the company. The theory assumes the existence of a social contract between the business organization and social actors. Grey et al. (2010) considers the society as a whole in relation to the organization. The theory expects that the norms and values of a society must be adhered to by the company to keep existing. Therefore, a company can only operate if the society believes that the company fulfils the societal norms and values. A seemingly contrasting theory is the signalling theory. The theory explains that firms are incentivized by their superior sustainability performance to voluntarily report on CSR to the public. Because of an information asymmetry problem, companies signal their superiority to strengthen their own position in the market compared to their competitors. To capitalize on their CSR activities, companies ensure that their stakeholders are able to recognize and assess their CSR quality (Moratis, 2018). This increases the ability of the company to attract investments (Verrecchia, 1983).

Omran & Ramdhony (2015) discussed the existence of multiple theories, which are used by researchers to explain the motivations of disclosing CSR information. These theories were originally developed in a context that did not refer to CSR. The authors found that there is no

universal theory when it comes to disclosing CSR information. Each theory is suitable for a different kind of situation. So, theories do not exclude each other but also cannot explain all business strategies. Hummel et al. (2016) discussed the existence of multiple theories that try to explain CSR disclosure by focussing on the legitimacy theory and the voluntary disclosure theory. They argued that while the theories are considered to be mutually exclusive, they are actually two sides of the same coin. Companies are inclined to disclose CSR information regardless of their performance. However, the difference lies in the quality of the provided reports.

While motivations for disclosure are debated, the actual implementation of a CSR report is also up for debate. Ndzibah (2009) discusses CSR reports being used as a strategic tool. He makes a distinction between CSR used as a strategic tool to trick and to treat readers. CSR reporting can be seen as a negative strategic tool if it is used to trick readers because it is seen as a deceitful action to fool the reader. However, CSR is considered a positive strategic tool if it is used to treat the readers. It implies that negotiation is facilitated between the disclosing party and the readers. Managers use a strategic tool to influence the reputation of the company, which is also discussed by Larringa et al. (2008). If the reputation of the company is damaged, the managers are required to restore it. Pérez et al. (2017) suggest that CSR reporting is used for impression management, which relates to the reputation of a company. While Ndzibah provides a starting point, Bebbington et al. (2014) argues that a confirmed theory that accurately explains CSR reporting behaviours is not yet confirmed.

Different researchers have discussed specific reasons for why management would use CSR reporting. Melloni et al. (2017) found that companies with a weak social performance tended to publish CSR reports that were difficult to read and contained less information. More recent research from China looks further in CSR as a strategic tool. In this case CSR is used specifically to manipulate analysts and their forecasts (Liang & Wu, 2022). They found that companies that perform badly are more likely to mislead analysts by using an abnormal positive tone in their CSR reports. Therefore, they suggest that CSR is used for greenwashing.

2.2 Using CSR report tone to greenwash earnings management

This research builds further on CSR being used by managers as a strategic tool to trick readers. While researchers have thus far not been able to develop a confirmed theory on the usage of CSR reports, attempts have been made. Li et al. (2023) discusses the relationship between earnings management and the tone of CSR reports. They found that earnings management is positively related to the tone in which a CSR report is written. Subsequently, they drew the conclusion that CSR reporting is therefore used to greenwash earnings management.

Greenwashing is defined by Delmas & Burbano (2011) as companies having poor environmental performance and disclosing positive communication about environmental performance. Baum (2012) defines greenwashing as the act spreading false information about the company's CSR practices to the readers or environmental benefits of a product from the company. Both definitions all describe greenwashing with two simultaneous behaviours, which are withholding negative information and publishing positive information regarding CSR (de Freitas et al., 2020).

Given these definitions, greenwashing implies that CSR is used as a strategic tool to trick people according to Ndzibah (2009). Notable is that earnings management is negatively related to ESG performance (Goncalves et al., 2021). So, companies that perform earnings management score low on ESG and seem to simultaneously use ESG information to mask their earnings management at the same time. This fits the narrative of the legitimacy theory. The results of Li are based on a Chinese sample. The results they found are derived from the regulatory environment in China, which lacks rules and enforcement. A consequence is that companies have the possibility to use greenwashing to their advantage without repercussion. Results on the relationship between reporting tone and earnings management may differ substantially in countries with a more sophisticated institutional system. Uyar et al. (2020) reject the assumption that CSR is used as a tool for greenwashing. They suggest that companies which have a greater CSR performance are more likely to publish CSR reports and publish a higher amount compared to companies that perform worse. The authors are in favour of the signalling theory, which implies that CSR is used as a strategic tool to treat the readers.

2.3 Hypothesis development

The previous paragraphs discussed the tendency of companies to disclose CSR reports for other reasons than providing investors with decision useful information. CSR reports are often used to trick readers by companies that are not performing well on CSR to protect their reputation. By using greenwashing, the poor performance is masked. According to Larringa et al. (2008), the managers are responsible for the reputation of the company. However, managers also have personal incentives next to those of the company, which may conflict.

Managers have an incentive to mask earnings management because it can be punishable (Dechow et al., 2010). Therefore, they take measures to prevent them from being caught by the authorities. According to Huang et al. (2018), managers of firms that have high accruals tend to use a more positive tone in press releases, possibly to avoid legal repercussions.

The positive tone in the CSR reports attempts to influence the emotional recognition that the company receives, regardless of the financial status of the company. Therefore, management has a clear motivation to use a positive reporting tone to increase public perception of the company's performance (Li et al., 2023). Bonusses of managers can be aligned with the performance of the company, which means that they have an incentive to manage earnings and show a better reported performance (Healy, 1985). Companies that have lower subsequent earnings tend to disclose less readable annual reports. This means that managers favour a higher reporting complexity to mask earnings management from stakeholders (Li, 2008).

The literature suggests that it is likely that managers use CSR reports as a strategic tool and more specifically to greenwash earnings management. It seems that CSR disclosures are often used to trick the readers rather than to treat the readers. Therefore, the following hypothesis is proposed:

H1: CSR reports are used as a strategic tool to greenwash earnings management.

3 Methodology

3.1 Proxy for earnings management

The level of earnings management in this research is determined by calculating the discretionary accruals of a company with the cross-sectional modified Jones model (Dechow et al., 1995). This model is considered to be one of the most effective models for detecting earnings management (Marai & Pavlovic, 2016). The main benefit of the model is that it is capable to capture the extent of earnings management. However, the model is not able to pinpoint the accounts that were used by management to manage earnings. The accruals of a company can be divided into discretionary and non-discretionary accruals. The discretionary accruals are calculated as follows:

$$\frac{TAcc_{i,t}}{A_{i,t-1}} = a_1 \left[\frac{1}{A_{i,t-1}} \right] + a_2 \left[\frac{(\Delta Rev_{i,t} - \Delta Rec_{i,t})}{A_{i,t-1}} \right] + a_3 \left[\frac{PPE_{i,t}}{A_{i,t-1}} \right] + \varepsilon_{i,t}$$

$TAcc_{i,t}$ implies the total operating accruals; $\Delta Rev_{i,t}$ denotes the change in revenue; $\Delta Rec_{i,t}$ represents the change in net receivables; $PPE_{i,t}$ is gross property, plant, and equipment; $A_{i,t-1}$ is total assets of last year.

With this formula a regression is conducted in which the discretionary accruals (DA) are the residuals. To be able to estimate the model a minimum of ten observations per industry (in this research per company) is needed. This research uses one observation per year, namely the reported quantity for that year.

3.2 CSR report tone

This research uses a sentiment analysis of Corporate Social Responsibility (CSR) reports by using the dictionary of Loughran and McDonald (2011). Words that are seen as negative or positive in general are relabelled by the dictionary to fit their sentiment in a business context. For example, words like taxes and liabilities were misclassified and added noise to the measurement according to Loughran and McDonald. They emphasize the risk of using a dictionary that is derived outside

of the domain of business usage. The research looks at texts from a business context. Therefore, the dictionary fits the research.

The dictionary provides five categories of sentiments in which a word is placed. This research uses the positive and negative wordlists. The choice was made because the scope of the research focuses on the negative to positive tone in the text that is analysed. The CSR reports are gathered from Refinitiv. The sentiment analysis over those reports is conducted in R-studio. The CSR report tone (TONE) is calculated in the following way:

$$TONE = (P - N)/(P + N)$$

Where P is the number of positive words and N is the number of negative words. A higher ratio value implies a more positive CSR report tone. A ratio of 0 means that the report is neutral, and under 0 implies a negative tone.

3.3 Proxy for greenwashing

Greenwashing is a complex variable and is difficult to measure (Marquis et al., 2020). Therefore, this research uses two proxies for detecting greenwashing because of a lack of a confirmed procedure for detecting greenwashing. By creating separate models for each proxy, the research creates an overview of the differences between the models when evaluating greenwashing practices. Both proxies have strengths as well as limitations.

3.3.1 Green communication and practice

The first proxy is based on the paper from Li et al. (2022). They use a matrix with high and low amounts of green communication and green practice, which they have based on Delmas & Burbano (2011). A greenwashing company has a high amount of green communication and a low amount of green practice. This implies that the company is using high amounts of means of communication to cover up their bad ESG performance, which aligns with the legitimacy theory. The main benefit of this model is that it takes the two main factors that are associated with greenwashing directly into account, ESG performance and positive ESG communication. The

model is limited in the sense that there is no benchmark for the point at which a number should be considered greenwashing.

$$\text{Greenwashing1}_{it} = \frac{\text{Green communication}_{it}}{\text{Green practice}_{it}}$$

For green practice the ESG scores of companies are used, which is provided by Refinitiv. The score ranges from 0 to 100. A score lower than 50 is considered poor and a score higher than 70 is considered excellent (Krychiw, 2023). Therefore, the cut-off point between high and low is 60. The score is divided by 100 to get to a ratio between 0 and 1. Therefore, the cut-off point is 0.6. Green communication is defined in the same way as the before mentioned variable TONE. The variable ranges from -1 to 1. With this model a higher ratio implies a higher likelihood of greenwashing being used.

3.3.2 CSR decoupling

The second proxy used in this research is CSR decoupling, which refers to the gap between the internal and external actions of the company's CSR practices (Zhao et al., 2022). Greenwashing is not the same as but related to decoupling (Graafland & Smid, 2016). While greenwashing is defined by Delmas & Burbano (2011) as the intersection between positive communication and poor performance, decoupling refers to the combination of promising policies and poor program implementation. Greenwashing is a form of decoupling strategy and an interplay of symbolic actions and substantive actions (Lyon & Montgomery, 2015). The method from Hawn & Ioannou (2016) is used. They use a lagged variable for internal actions. This method exposes the misalignment of internal and external CSR actions. One can assume that the firm is greenwashing if external actions exceed the internal actions.

$$\text{Greenwashing2}_{it} = \text{ExternalActions}_{it} - \text{InternalActions}_{it-1}$$

With $\text{ExternalActions}_{it}$ being the current external CSR actions and $\text{InternalActions}_{it-1}$ referring to the lagged internal CSR actions. Both variables are provided by Refinitiv. This proxy

tackles the communication part of greenwashing quite well by involving external actions, which refer to the communication about policy implementation. However, the proxy does not necessarily tackle the performance part of greenwashing. The method makes up for that by mentioning the failure of policy implementation.

3.4 Cluster analysis

This research uses a cluster analysis in which the previously mentioned variables are visualized in a 3D model. A cluster analysis provides a visual overview of structures within the dataset. It 'clusters' matching data points together. This method results in an overview of the number of strategies that are visible within the dataset. The data shows whether there exists a relationship between earnings management, tone of CSR report, and greenwashing.

The study uses the agglomerative hierarchical clustering method. With the agglomerative hierarchical clustering method, the desired number of clusters is estimated, which imply the number of strategies used by companies (Murtagh, 2011). The distance measurement and calculation are conducted by the algorithm. The method starts with each datapoint forming a cluster of its own. They are put together in a cluster when their patterns match. The closest matching clusters are put into a combined cluster, which repeats itself until every individual data point is eventually gathered into one big cluster. A dendrogram visualizes how the data points were clustered step by step, providing an overview of how each data point is related to another. The height of the connection shows how closely related the data points are. This method gives an easily understandable overview of the data set in which we identify meaningful clusters and does not require a prediction of the amount of clusters 'k' beforehand. However, to obtain a clustering result with a specific number of clusters, a value for 'k' is provided so the algorithm cuts the dendrogram tree at a certain height where there are exactly k sub-trees underneath (Rouge, 2007). This study uses two separate cluster analyses, which cut the height at a different point. This is specified in the results section.

This study uses the Euclidean (ScienceDirect) distance measurement method to measure the distance between the individual data points. This is the default distance measurement method to measure dissimilarity in the dataset and is the absolute distance between datapoints. It is chosen

due to its simplicity and interpretability. The data points used in the research are viewed separately and not how they change over time. Therefore, the Euclidean method fits the data. The measurement takes the magnitude and direction of differences into account. It is calculated by taking the square root of the sum of the square differences. A cluster based on the Euclidean distance can be seen as compact because it looks at the spatial separation of datapoints.

For combining the singletons, the study uses the average linkage method. This method defines the distance between 2 clusters as the average of distances between all pairs of objects. The average linkage method is a middle ground between the single linkage method and complete linkage method. It is less sensitive to outliers. Therefore, the method cancels out the extremes of both large and tight clusters (Yang, 2017). The used dataset may have outliers, which this method is less susceptible for.

The agglomerative hierarchical cluster analysis is conducted using R-studio, which requires the specification of the linkage method. R-studio uses the Euclidean distance measurement by default.

3.5 Sample selection

This research focuses on the employment of CSR for strategic purposes. The study looks at a sample of companies from countries in the European Union (EU) between 2012 and 2022. Additionally, the United Kingdom and Switzerland are added to the sample. The choice for EU countries was built upon the implications of the new Corporate Sustainability Reporting Directive. From 2024, many companies based in the EU will have to adhere to the new rules that are imposed. Companies from the United Kingdom (Landmark, 2023) and Switzerland (KPMG, 2022) are also affected by the new directive as many have operations and are publicly listed in the EU. The CSRD was implemented by the European Parliament to further develop CSR reporting standards. It mandates companies to provide a more detailed and therefore higher quality CSR report. Companies that are subject to the regulation set by CSRD must alter their reporting systems and change how they manage their business. Therefore, costs related to CSR disclosure increase (Baumüller & Sopp, 2022). The goal of CSRD is to increase sustainability practices in the EU. However, the CSR reports are required to consist of a lot of detailed and complex information.

With a shortage of experts in the field, the problem arises of how accountants can provide assurance over the reports (F. van Beest, 2022). The complexity of the work of the accountant increases, which will make it increasingly difficult to see through greenwashing practices of managers. Research on this topic can provide help to accountants in the future by providing insights in the relationship between the reporting tone of CSR disclosures and earnings management.

The chosen time period, 2012 to 2022, provides the latest information on companies when conducting the research. The Modified Jones Model requires at least ten years of data in order to calculate the level of earnings management of a company per year. Therefore, the timeframe consists of eleven years because the calculation of the Modified Jones Model also requires the change of variables between years (Rev & Rec) and a lagged variable (A).

While there are still a lot of countries that should be researched regarding responsibility reporting, the choice between industrialized countries and developing countries is not relevant as there is no “dividing line” between countries regarding CSR reporting (Fifka, 2013). Countries across Asia and Africa are yet to be researched just as several highly developed countries. To add to the context of CSR reporting, research should be conducted across the globe, regardless of the status of a country’s development.

4 Results

In this section, the results of two agglomerative hierarchical cluster analyses are explained and presented visually. Two different proxies are used to inspect the employment of Corporate Social Responsibility (CSR) reports in relation to earnings management. The aim of the analyses is to identify whether one or more clusters explain that CSR reports are being used as a strategic tool by management to greenwash earnings management. The companies are grouped based on their level of earnings management, level of greenwashing, and the tone (negative to positive) used in CSR reports. A cluster implies that CSR is used as a strategic tool to greenwash earnings management when greenwashing has a positive value, the tone of a CSR report is positive, and earnings management is not zero.

4.1 Formation of clusters

At the start of this section, a comparison of the dendrograms derived from the dataset using different greenwashing proxies is made. The number of clusters are obtained using the Euclidean distance, average linkage, and elbow-method, which provided a grouping of respectively 3 and 2 clusters in each analysis. The elbow-method is conducted by graphing the within-cluster sum of squares (WCSS) against the number of clusters. The WCSS value indicates the compactness and similarity of the datapoints in a cluster. A lower WCSS value implies that the cluster is compact and that the datapoints are similar to each other. The optimal number of clusters is found by minimizing the WCSS while simultaneously avoid having many clusters. The optimal point can be visually deduced by looking for the point at which the marginal decrease changes the most.

In the dendrogram, the vertical axis represents the dissimilarity between the datapoints and clusters, denoted by the height. A greater height at which datapoints are merged implies a greater dissimilarity. The horizontal axis represents the merging of data points into clusters, which conducted in a bottom-up approach in this study.

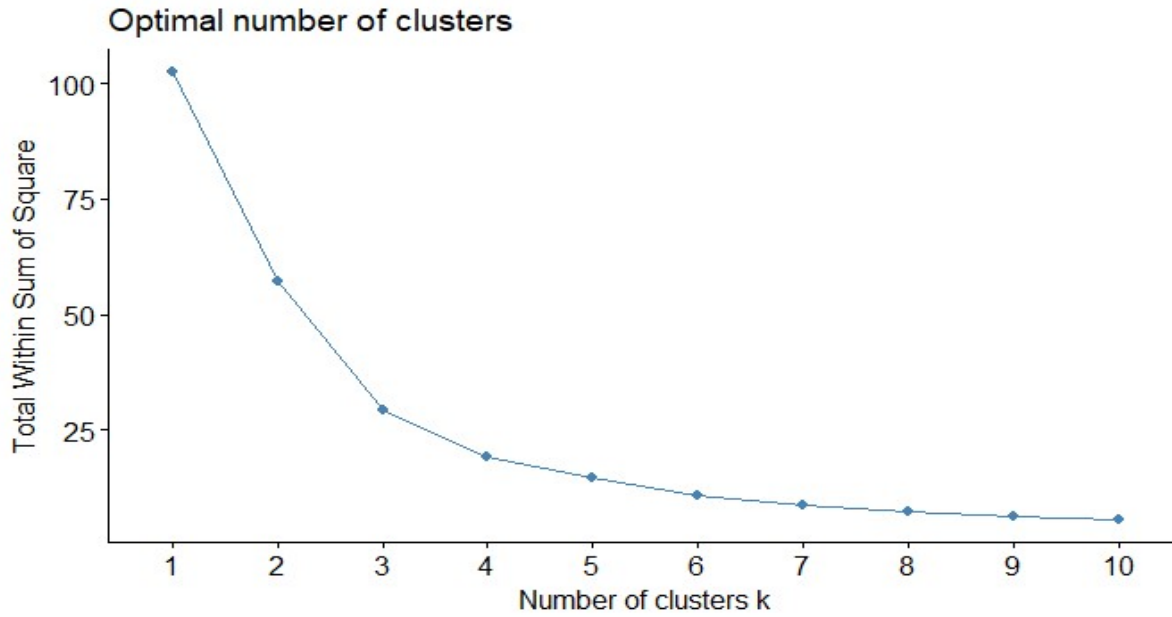


Figure 1: Elbow-method cluster analysis using Greenwashing1

Figure 1 shows the graph of the relation between the WCSS and the number of clusters. The marginal decrease of the graph changes the most at $k = 3$. Therefore, the optimal number of clusters in the cluster analysis using Greenwashing1 is three.

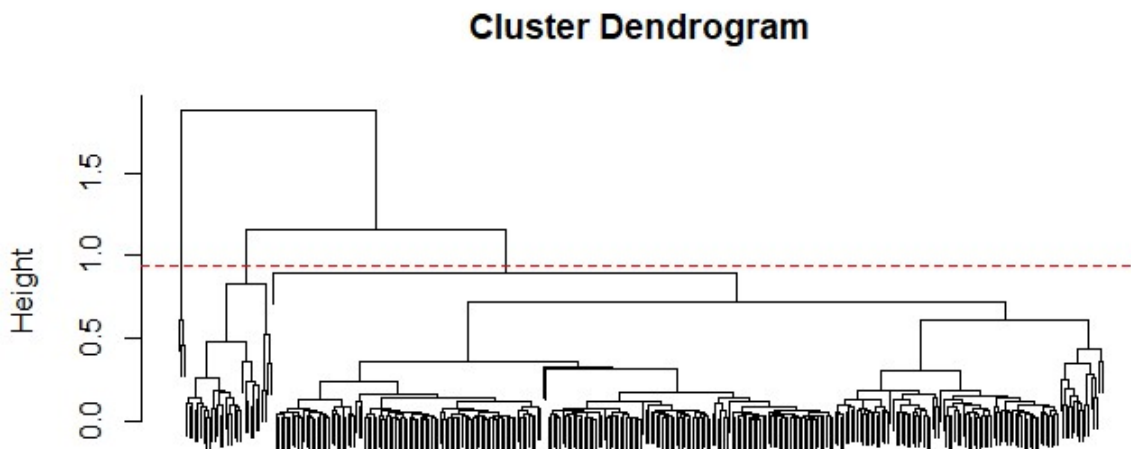


Figure 2: Dendrogram cluster analysis using Greenwashing1

The dendrogram of the first cluster analysis uses Greenwashing1, which is defined by green practice and green communication. Figure 1 shows the presence of three clusters. The cutoff line visualized in figure 1 is based on the elbow method, which was discussed earlier. The sizes of the clusters are unequally distributed. Cluster one has 31 singletons, cluster two consists of 299 singletons, and cluster three has 3 singletons. Cluster three, which can be found on the far left of the dendrogram, merges with the other clusters at a substantial height. This implies that the cluster has a high dissimilarity with the other two clusters.

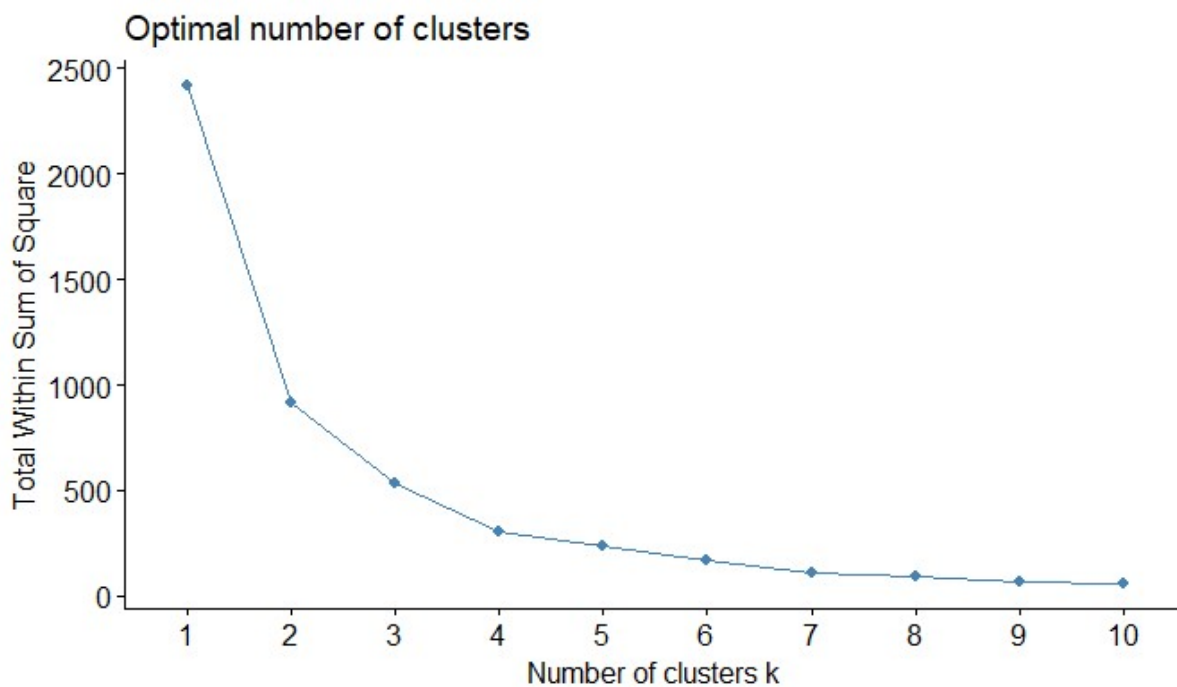


Figure 3: Elbow-method cluster analysis using Greenwashing2

Figure 3 shows the graph of the relation between the WCSS and the number of clusters. Before the analysis was conducted, two outliers were removed from the dataset. The two outliers formed a single cluster, which would mean that originally a third cluster existed. They were removed from the dataset because a cluster of two singletons could not be statistically analysed by the tests that are performed in the research to measure significance.

The marginal decrease of the graph changes the most at $k = 2$. Therefore, the optimal number of clusters in the cluster analysis using Greenwashing1 is two. Therefore, the second cluster analysis has one cluster less than the first cluster analysis.

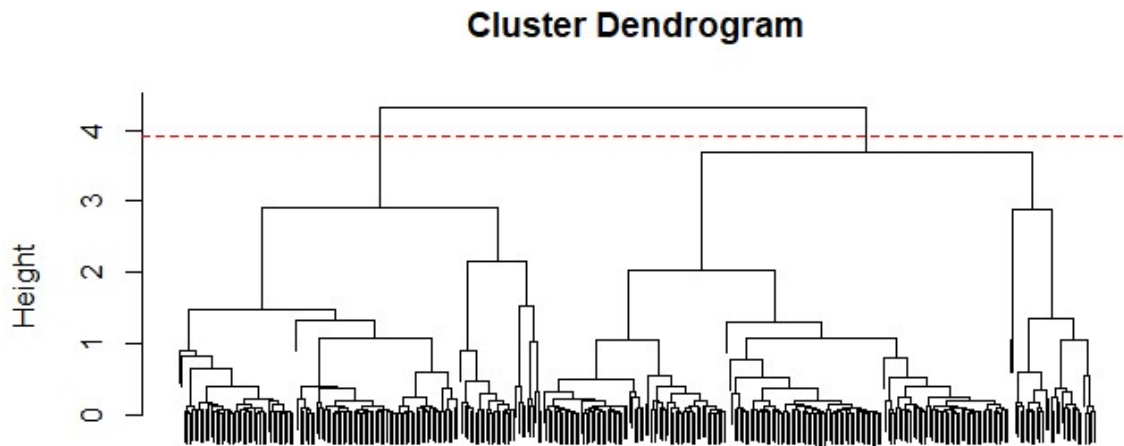


Figure 4: Dendrogram cluster analysis using Greenwashing2

The second dendrogram uses Greenwashing2, which is defined by decoupling. Figure 4 shows the presence of 2 clusters. The point where the height is cut off is based on the elbow-method, which is discussed based on figure 3. The variable Greenwashing2 seems to have a strong impact on the formation of clusters, which can be seen clearly in figure 6. The clusters cut smoothly at the point between $X = -2$ and $X = -3$. At first glance we see that the clusters are more equally distributed than the clusters of the first analysis. Cluster one has 135 singletons and cluster two includes 205 singletons.

The difference in height between the dendrograms implies that the clusters in the first dendrogram are relatively more similar to each other. This could be because of a limitation in the variable Greenwashing1, which is partly calculated by the sentiment of the CSR report. Visually this limitation can be seen in figure 5, which shows a rather straight line of companies on the X- and Y-axis. Because the proxies for greenwashing give different outcomes, there is also little overlap between the clusters that formed in both dendrograms.

4.2 First cluster analysis

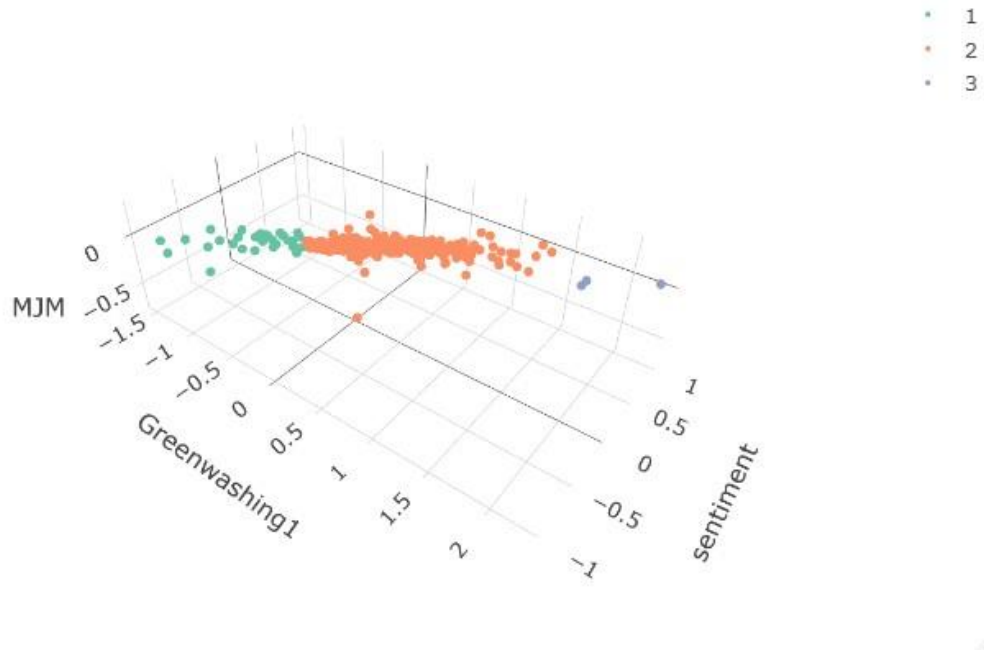


Figure 5: 3D model cluster analysis using Greenwashing1

Figure 5 shows the distribution of singletons with different colours based on their assigned cluster. The sizes of the clusters are distributed unequally. Cluster two is much larger than cluster three.

The figure shows that companies in cluster one, show no signs of greenwashing based on the employed proxy and dispersed levels of earnings management (MJM). Simultaneously they also use a more negative tone in their CSR disclosures. On the other hand, companies residing in cluster two show signs of greenwashing ranging from none to a lot while also having greater dispersed levels of earnings management. The companies in cluster two use a neutral to positive tone in their CSR disclosures. Cluster three includes companies which show a lot of signs of greenwashing, some levels of earnings management, and a rather positive tone in their CSR disclosures.

Overall, the variable earnings management shows dispersed values indicating that every cluster deals with the practise. Cluster three and partially cluster two shows that a positive tone in CSR

disclosures is used to greenwash earnings management, which is in line with the hypothesis of this study and the results found by Li et al. (2023).

The descriptive statistics of the variables are inspected to explain the variables used in the formation of clusters, beginning with Greenwashing1. This variable distinguishes the results of both cluster analyses. Based on the median and mean scores, table 1 shows that cluster three scores the highest on greenwashing while cluster one has the lowest score, which is in line with the visualization of figure 5.

Table 1: Descriptive statistics for Greenwashing1 in cluster analysis using Greenwashing1

Cluster	Median	Mean	SD	Minimum	Maximum
1	-0.6554359	-0.6960274	0.3002893	-1.4997386	-0.3256077
2	0.2079069	0.2696733	0.3441050	-0.3340165	1.4159435
3	1.7825156	1.8983170	0.2931168	1.6807908	2.2316446

The descriptive statistics shown in table 2 present the variable TONE in the cluster analysis using Greenwashing1. Based on the median and mean scores, the highest scoring cluster is cluster three and the lowest scoring cluster is cluster one. The ranking is identical to the ranking of table 1 and is in line with the visualization in figure 5. The ranking can be explained by the fact that both variables involve the sentiment score of the CSR disclosure of the companies.

Table 2: Descriptive statistics for TONE in cluster analysis using Greenwashing1

Cluster	Median	Mean	SD	Minimum	Maximum
1	-0.6554359	-0.6960274	0.3002893	-1.4997386	-0.3256077
2	0.2079069	0.2696733	0.3441050	-0.3340165	1.4159435
3	1.7825156	1.8983170	0.2931168	1.6807908	2.2316446

Table 3 presents the descriptive statistics of earnings management in the cluster analysis using Greenwashing1. This variable is ranked differently because of the implications of the variable. Earnings management can be downward and upward meaning that when there is a value that is not zero, earnings management is used by the company. Therefore, it is difficult to rank the clusters based on the descriptive statistics. If we would look at the minimum and maximum values of the clusters, cluster two has the most extreme values. Therefore, showing the highest levels of earnings management. However, we saw that in this case the level of earnings management is not a matter to be ranked as it is present in all three clusters.

Table 3: Descriptive statistics for MJM in cluster analysis using Greenwashing1

Cluster	Median	Mean	SD	Minimum	Maximum
1	0.007573721	-0.007975054	0.07577989	-0.2652651	0.10887168
2	0.008386272	0.006731893	0.06779745	-0.7485541	0.29736227
3	0.023657287	-0.017596269	0.11424189	-0.1467349	0.07028878

Overall, it can be observed that cluster three scores the highest on TONE and Greenwashing1. Combined with the presence of earnings management, this would indicate that CSR disclosures are used as a strategic tool to greenwash earnings management by companies in that cluster. Therefore, a positive tone in CSR reports is used as a tool to trick readers (Ndzibah, 2009). However, the cluster includes merely three singletons, which hardly proves the findings of Li et al. (2023). Cluster two partially showed signs of the results as found by Li et al.. The singletons in that cluster with the highest amount of greenwashing and positive tone had higher levels earnings management. However, it is visible that earnings management is present in all clusters, which means that it does not necessarily involve greenwashing and a positive tone in CSR disclosures.

4.3 Second cluster analysis

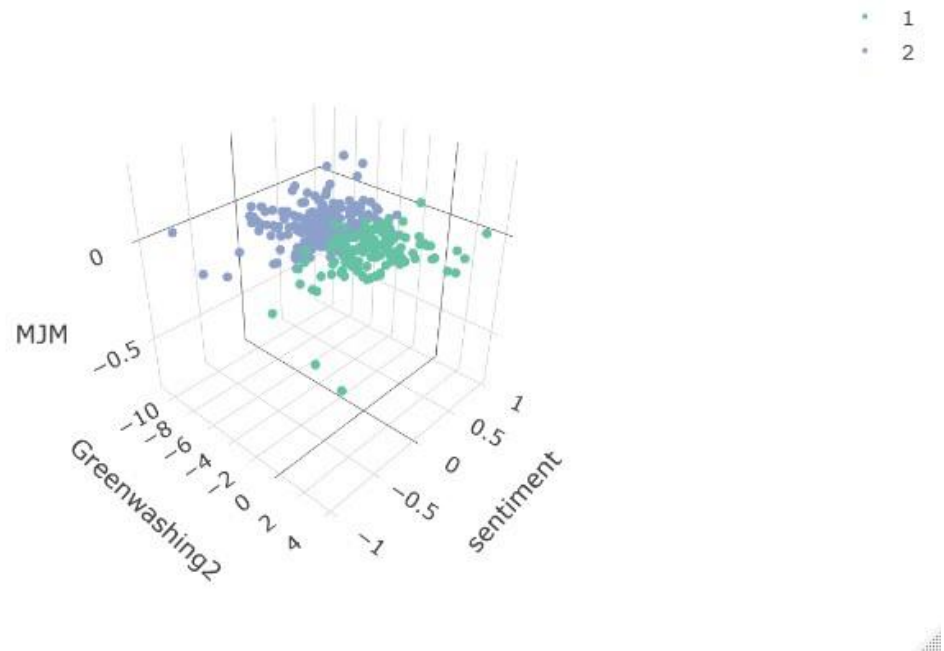


Figure 6: 3D model cluster analysis using Greenwashing2

Figure 6 shows the placement of singletons by colour based on their assigned cluster. The sizes of the clusters are more equally distributed than in the first cluster analysis. Cluster two (205) is larger than cluster one (135).

The cluster analysis involving Greenwashing2 shows different results in comparison to the cluster analysis involving Greenwashing1. Following decoupling, a lot less companies show signs of greenwashing. Most companies fall under zero with Greenwashing2. Simultaneously, most singletons are now showing a positive tone in CSR disclosures, no matter the value of Greenwashing1. Both clusters again have dispersed levels of earnings management. However, while cluster one has higher levels of greenwashing, cluster one shows a smaller dispersion than cluster two. Therefore, in the existence of earnings management, companies have lower amounts of greenwashing.

Overall, the 3D model seems to indicate that CSR reports are not used as a strategic tool to greenwash earnings management. Instead, a positive tone is used by companies that do not greenwash but do manage earnings. The reason for the positive tone lies elsewhere. A simple explanation could be that the CSR performance of the companies in question is good. Therefore, the companies use a positive tone within their CSR disclosures.

The variable for greenwashing in the cluster analysis using Greenwashing2, has a large influence on the formation of clusters. Therefore, we look at the descriptive statistics of that variable first. Table 4 shows the descriptive statistics of Greenwashing2. Based on the median and mean scores, cluster one scores higher than cluster 2. Noteworthy is that the mean scores are both negative, which again shows that many companies are viewed by this proxy as not using greenwashing.

Table 4: Descriptive statistics for Greenwashing2 in cluster analysis using Greenwashing2

Cluster	Median	Mean	SD	Minimum	Maximum
1	-1	-0.5259259	1.485400	-2	4
2	-4	-4.8097561	1.714386	-11	-3

Table 5 shows the descriptive statistics for the variable TONE in the cluster analysis involving Greenwashing2. Based on the median and mean scores, the highest scoring cluster is cluster two. Cluster one scores the lowest. Noteworthy is that the mean scores are both positive. The reason

for this is that the distribution of the singletons is different from the distribution in the first cluster analysis. The companies that implement a more positive tone in their CSR reports are more equally distributed in this case.

Table 5: Descriptive statistics for TONE in cluster analysis using Greenwashing2

Cluster	Median	Mean	SD	Minimum	Maximum
1	0.1087268	0.1123834	0.3022847	-1.0000000	1.0000000
2	0.1262136	0.1393003	0.2801599	-0.9333333	0.9393939

The descriptive statistics relating to earnings management in the cluster analysis involving Greenwashing2 are presented in table 6. The cluster with the greatest divergence in minimum and maximum is cluster one. However, the reason for that is because of outliers in the sample. In the 3D model it is visible that cluster two has a greater dispersion of earnings management than cluster one but that does not become clear from table 6.

Table 6: Descriptive statistics for MJM in cluster analysis using Greenwashing2

Cluster	Median	Mean	SD	Minimum	Maximum
1	0.01171403	-0.0041073	0.07966957	-0.7485541	0.1280570
2	0.00778891	0.01102694	0.05968304	-0.2413715	0.2973623

Overall, cluster one comes the closest to the findings of Li et al. (2023). However, the cluster analysis hardly proves it. Cluster one has a positive value for Greenwashing2 and TONE but a lower dispersion of earnings management. On the other hand, while also having more positive CSR disclosures, cluster two has a greater dispersion of earnings management but show no signs of greenwashing. This indicates that there is a different strategy present in the sample than the

findings of Li et al. had suggested. The strategy is more in line with treating the readers of the CSR disclosures as there is no greenwashing present and therefore shows no malicious intent in this model (Ndzibah, 2009).

4.4 Statistical tests

The clusters in the previous sections are tested on the significance of their dissimilarity. The assumptions made in the previous sections are either confirmed or rejected based on the tests. This study conducts three tests: the Shapiro-Wilk test, the Kruskal-Wallis test, and the Wilcoxon rank sum test.

To test if the variables used in the cluster analysis have normal distribution, the Shapiro-Wilk test is conducted. A low p-value implies that the variable is not normally distributed. The test determines whether the mean value has a representative value of the data (Mishra, 2019). In the first cluster analysis (Appendix 1), all variables have a p-value lower than $\alpha = 0.05$. This implies that the variables are not normally distributed. In the second cluster analysis (Appendix 2), all variables also have a p-value lower than $\alpha = 0.05$.

Non-parametric tests are conducted on the variables because all variables are deviating significantly from being normally distributed. These tests do not require the data to be normally distributed (Taylor, 2023). The tests test the significance of the dissimilarity between the clusters that are formed.

First, the Kruskal-Wallis test is conducted to test the significance of the overall distribution of the variables between the clusters (McKnight, 2010). A low p-value implies that the difference between clusters is statistically significant. In the first cluster analysis (Appendix 3), the variables TONE and MJM have a p-value lower than $\alpha = 0.05$. Therefore, the variables difference is significant among the clusters. However, Greenwashing 1 has a higher p-value than the α . Therefore, Greenwashing1 is not significantly different among the clusters. This implies that the clusters have somewhat identical populations. Therefore, you cannot differentiate between the clusters.

In the second cluster analysis (Appendix 4), the variable MJM has a lower p-value than $\alpha = 0.05$. Therefore, the variable is significantly different among the clusters. Greenwashing2 and

TONE have a higher p-value than the alpha. This implies that the variables are not significantly different among the clusters and have identical populations. Therefore, you cannot differentiate between the clusters.

Second, to inspect the difference between individual cluster combinations per variable, Wilcoxon rank sum tests are conducted. The tests provided different views on the clusters than the Kruskal-Wallis test. In the first cluster analysis, Greenwashing1 (Appendix 5) has a p-value lower than $\alpha = 0.05$. Therefore, there are significant differences between each combination of clusters. This is different from the Kruskal-Wallis test that implied that there was no significant difference between the clusters overall. The Kruskal-Wallis test indicated significant differences between the clusters regarding MJM. However, the Wilcoxon rank sum test scores each combination of clusters with a p-value higher than alpha for MJM (Appendix 7). Therefore, the differences between the cluster combinations are not significant.

The second cluster analysis only has the cluster combination of cluster one and two. Greenwashing2 (Appendix 8) shows a significant difference, which was not significant according to the Kruskal-Wallis test. On the other hand, TONE (Appendix 9) and MJM (Appendix 10) score a higher p-value than $\alpha = 0.05$, which implies a non-significant difference. The Kruskal-Wallis test implied that MJM was significantly different among the clusters.

Overall, the assumption that the identified clusters in both analyses are different is rejected as the tests show insignificance of the difference among the clusters. It shows that there is a degree of overlap between the strategic implementation of CSR disclosures.

5 Conclusion & Discussion

This study tried to test the findings of Li et al. (2023) by answering the research question: Is a positive tone used in CSR reports as a strategic tool to greenwash earnings management? The study uses a novel method, typically not used in this field, to test the research question. Two agglomerative hierarchical cluster analyses using two different proxies for greenwashing were conducted, which resulted in different outcomes. The proxies distributed the companies in the sample differently among the 3D models. The cluster that was identified, in the first analysis, to use Corporate Social Responsibility (CSR) disclosures as a strategic tool to greenwash earnings management had a low number of singletons residing in them, which indicated that the strategy is rare within the sample. In the second analysis, the sample showed a different strategy than hypothesized. Companies that managed earnings and had more positive CSR disclosures were not greenwashing. The findings of Li et al., which claim that CSR is used as a strategic tool to greenwash earnings management is hardly supported by the results of the cluster analyses conducted in this study.

While the results sound plausible with respect to the legitimacy theory, other factors may play a role regarding the strategic implementation of a positive tone in CSR disclosures, which relate to other theories explaining reporting behaviour. The results from the second analysis are more in favour of treating the readers rather than to trick the readers as the reporting tone was generally high in the cluster with no signs of greenwashing. Furthermore, the results may hold only in a Chinese or similar sample, which was used by Li et al.. China lacks the institutions regarding CSR disclosure that are present in the EU. Even so, their findings cannot be generalized globally as the results in this study imply. The methodology of this study could be improved for a future study on a Chinese sample to test the findings of Li et al..

The results of the research may be flawed by several factors. The sentiment analysis is sensitive to errors in the gathering and cleaning process of the data. The CSR reports were gathered from the Refinitiv database, which is not made for academic purposes but for investment purposes. This, combined with the possibility of human error, could result in that the creation of the database used for this research may contain several disclosures that have a sentiment value that does not correctly represent the company in a particular point in time.

As discussed earlier, greenwashing is a complex variable, which means that it is difficult to measure it in units as well as that proxies may have a different opinion on whether a company is greenwashing. To reduce the effect of this on the results, the research used 2 proxies for greenwashing. Future research could include more proxies for greenwashing. However, it is important that the proxies are tested on their ability to put a value on greenwashing. Furthermore, the first proxy that was used contained a variable in the calculation, which was also separately used in the cluster analysis. To provide meaningful evidence for the findings of Li et al., researchers should first focus on the development of sound proxies for greenwashing. The development is important for removing the differences between existing proxies in the assigned valuation they give.

The findings in this study are based on a sample consisting of EU countries plus the United Kingdom and Switzerland between and including 2012 and 2022. The sample was preferred due to the upcoming Corporate Sustainability Reporting Directive regulations of 2024, which many EU-based and operating companies must adhere to. Future research could replicate the aim of this study and apply it to specific countries as each country might have different outcomes. The specific choice of a country is not of interest due to the relatively new research field. There is no “dividing line” between developing and developed countries (Fifka, 2013).

6 Appendix

6.1 Reference list

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6.2 Databases

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6.3 List of variables

Variable	Description
DA	Discretionary accruals estimated with Modified Jones Model
TAcc	Total accruals, provided by Refinitiv
Rev	Revenues, provided by Refinitiv
Rec	Net receivables, provided by Refinitiv
PPE	Property, plant, and equipment, provided by Refinitiv
A	Total assets, provided by Refinitiv
TONE	Difference between positive and negative words divided by the total, provided by Loughran & McDonald dictionary, Measured with ATLAS
GREENWASHING1	Green communication divided by green practice
GREENWASHING2	CSR decoupling calculated by subtracting internal actions from external actions
Green communication	Difference between positive and negative words divided by the total, provided by Loughran & McDonald dictionary, Measured with R-studio
Green practice	ESG score provided by Refinitiv divided by 100
ExternalActions	External actions provided by Refinitiv
InternalActions	Internal actions provided by Refinitiv

6.4 Statistical tests

Table Appendix 1: Shapiro-Wilk test cluster analysis using Greenwashing1

Variable	p-value
Greenwashing1	1.081812e-06
sentiment	4.602095e-04
MJM	4.090706e-24

Table Appendix 2: Shapiro-Wilk test cluster analysis using Greenwashing2

Variable	p-value
Greenwashing2	2.012772e-03
sentiment	6.392873e-04
MJM	3.891413e-24

Figure Appendix 3: Kruskal-Wallis test cluster analysis using Greenwashing1

Test	p_value	statistic	df
Greenwashing1	0.7685179	0.5265829	2

Test	p_value	statistic	df
TONE	0.0000000	90.58154	2

Test	p_value	statistic	df
MJM	0.0000000	91.36107	2

Figure Appendix 4: Kruskal-Wallis test cluster analysis using Greenwashing2

Test	p_value	statistic	df
Greenwashing2	0.3601507	0.8373679	1
Test	p_value	statistic	df
TONE	0.6539828	0.2009156	1
Test	p_value	statistic	df
MJM	0.0000000	246.8333	1

Figure Appendix 5: Wilcoxon rank sum test cluster analysis using Greenwashing1
(Greenwashing1)

Cluster	Cluster	p-value
1	2	0.0000000
1	3	0.0003342
2	3	0.0029126

Figure Appendix 6: Wilcoxon rank sum test cluster analysis using Greenwashing1 (TONE)

Cluster	Cluster	p-value
1	2	0.0000000
1	3	0.0003342
2	3	0.0044562

Figure Appendix 7: Wilcoxon rank sum test cluster analysis using Greenwashing1 (MJM)

Cluster	Cluster	p-value
1	2	0.4937959
1	3	0.7309491
2	3	0.8264366

Figure Appendix 8: Wilcoxon rank sum test cluster analysis using Greenwashing2
(Greenwashing2)

Cluster	Cluster	p-value
1	2	0.0000000

Figure Appendix 9: Wilcoxon rank sum test cluster analysis using Greenwashing2 (TONE)

Cluster	Cluster	p-value
1	2	0.6543897

Figure Appendix 10: Wilcoxon rank sum test cluster analysis using Greenwashing2 (MJM)

Cluster	Cluster	p-value
1	2	0.3604466
