A Critical Analysis of Greenwashing Practices in Corporate Advertising: Unmasking Deceptive Environmental Claims

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Abstract

Greenwashing is a deceptive practice where companies use misleading information to present themselves as environmentally responsible, despite their actions not reflecting these claims. This is commonly seen in corporate advertising, where elements such as nature imagery, green colors, and environmental terms are employed to create a positive brand image and build consumer trust. However, many companies fail to live up to their environmental promises, masking harmful practices behind a façade of sustainability. Corporate Social Responsibility (CSR) initiatives are intended to demonstrate a company's commitment to social and environmental issues, yet the prevalence of greenwashing calls into question the authenticity and effectiveness of these efforts in promoting genuine sustainability. This project seeks to analyze corporate advertising to identify signs of greenwashing, focusing on visual cues that mislead consumers about a company's environmental impact, using Optical Character Recognition (OCR) and Computer Vision techniques.

Keywords: Greenwashing, Corporate Social Responsibility (CSR), Environmental Impact, Green Color, Optical Character Recognition (OCR), Computer Vision techniques.

1 Introduction

Greenwashing generally refers to an organization’s deceptive communication or misinformation regarding its environmental impact. Corporate greenwashing specifically involves making false or exaggerated environmental claims to enhance a company's reputation. In today's society, where environmental concerns play a significant role, consumers consider them an important factor when making purchasing decisions. This phenomenon has become a significant concern, as it not only deceives consumers but also undermines genuine sustainability efforts (United Nations, 2023; Williams, 2024).

According to the United Nations (2023), greenwashing can take many forms, including making future environmental promises without concrete plans, using vague or unverifiable claims, overstating a product's environmental benefits, and selectively highlighting positive attributes while ignoring broader environmental impacts. Companies may also promote products that meet only basic legal standards, misleading consumers into believing they exceed industry norms (United Nations, 2015; United Nations, 2024). The prevalence of greenwashing can be attributed to the growing demand for sustainable products and services. Additionally, Walker & Wan (2012) highlighted how greenwashing techniques leverage strategic advertising to mislead consumers about a product’s true environmental impact.

Corporate Social Responsibility (CSR) aligns with the Sustainable Development Goals (SDGs) under the UN’s 2030 Agenda, emphasizing environmental, social, and economic sustainability. Key milestones include the UN Global Compact (2000), UN Guiding Principles on Business and Human Rights (2011), and SDG adoption (2015). Companies integrate SDGs into CSR, addressing issues like climate action (SDG 13) and economic growth (SDG 8). However, greenwashing undermines genuine efforts by fostering misleading sustainability claims, eroding public trust, and hindering progress (United Nations, 2015).

As awareness grows, researchers and regulatory bodies continue to develop strategies to combat greenwashing. Studies by Lyon & Montgomery (2015) have stressed the role of policy enforcement, while advancements in artificial intelligence, as explored by Woloszyn et al. (2021), offer promising methods for detecting fraudulent claims. The increasing scrutiny of corporate sustainability practices underscores the importance of holding businesses accountable to ensure that environmental progress is driven by genuine action rather than mere marketing tactics.

2 Method

This section provides an overview of the process to achieve our aim, as illustrated in Figure 1.

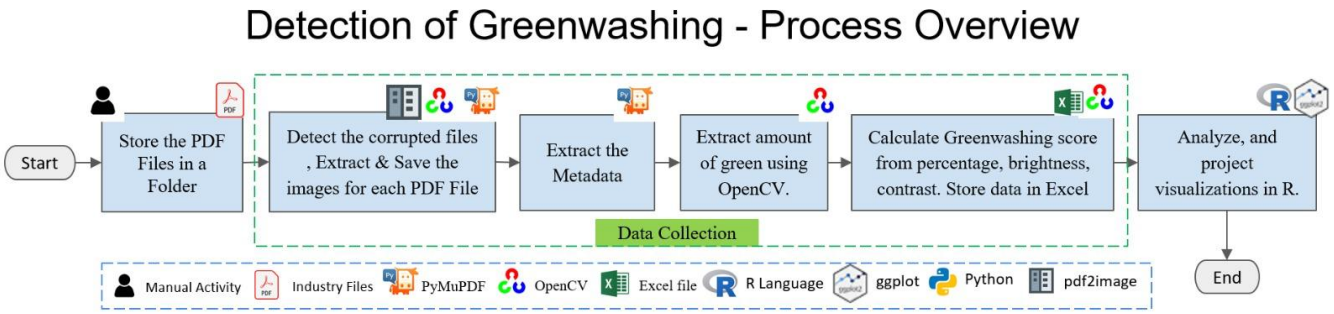


Fig 1: Process Flow Diagram

2.1 Data collection

A Python script identified and removed corrupted PDFs. Images were extracted using PyMuPDF, with pdf2image and OpenCV improving accuracy. Metadata was obtained via Fitz and integrated with RDS data. A greenwashing detection model analyzed image colors, generating a greenwashing score. The metadata and scores were compiled into an Excel file for analysis.

2.2 Data preprocessing and extraction

Finally, using the R language we perform the analysis to generate visualizations from the data, allowing the identification of trends and patterns in the use of greenwashing tactics across industries and time periods. Figures 2, 3 and 4 illustrate the number of CSR Reports analyzed by Sector, Region and Company Size providing clear insights into the scope of data examined.

Fig 2: Number of Reports Analysed by Sector

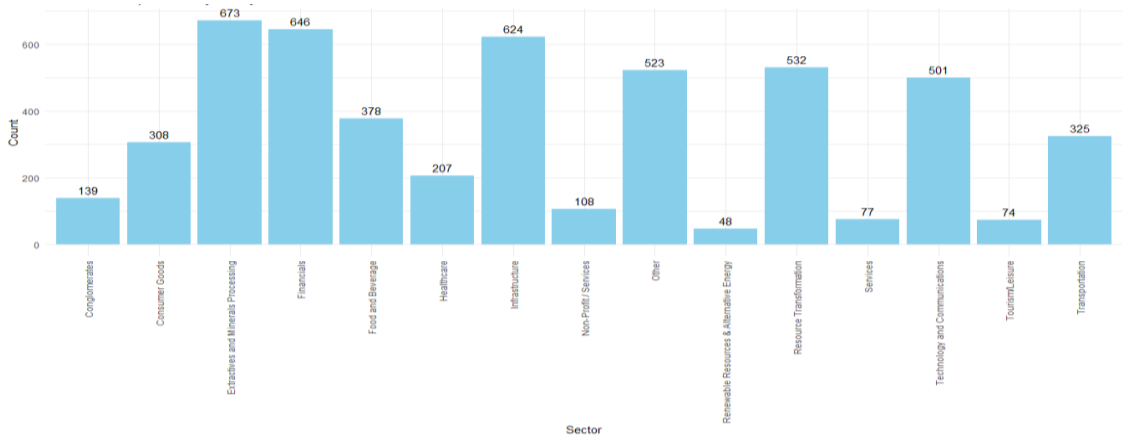


Fig 3: Number of Reports Analysed by Region

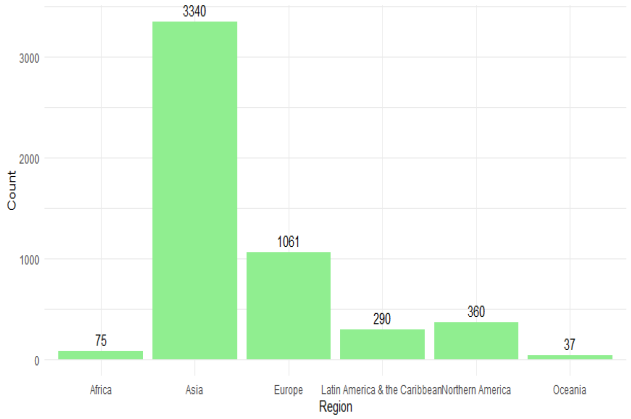
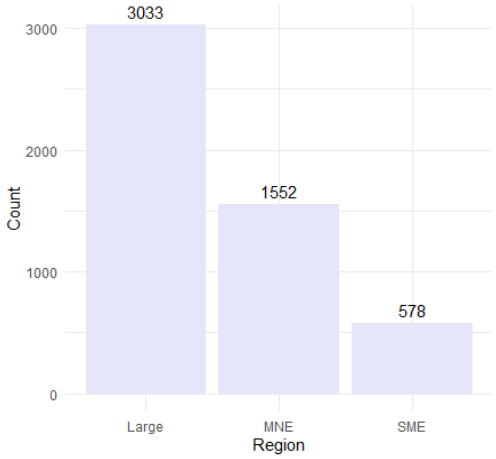


Fig 4: Number of Reports Analysed by Company Size



2.3 Analysis and Visualization

After extracting all the data, we created a data frame storing detailed information from each report. We perform a thorough analysis to identify patterns and variations in different sectors. We used R and the 'ggplot' library to generate visualization of our results, ensuring consistency in design while following Tufte's principle for data visualization.

3 Results

3.1 Greenwashing by Sector

- Industries with high carbon footprints, like food, beverage, and consumer goods, exhibit more greenwashing (Figure 5), likely due to pressure from environmental groups. The (Figure 6) shows an upward trend in greenwashing within CSR reports of food and beverage corporations.
- Sectors such as Technology and Communication and Financials portray low levels of greenwashing (Figure 5 and 7).
- Industry sectors like Renewable Resources & Alternative Energy and Infrastructure that are expected to follow sustainable, show moderate levels of greenwashing.

Fig 5: Total Greenwashing by Sector

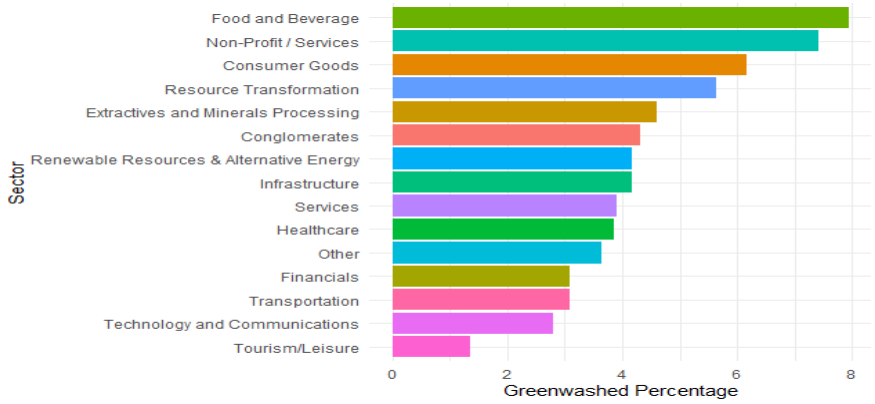


Fig 6: Greenwashing by Year (Food and Beverage Products)

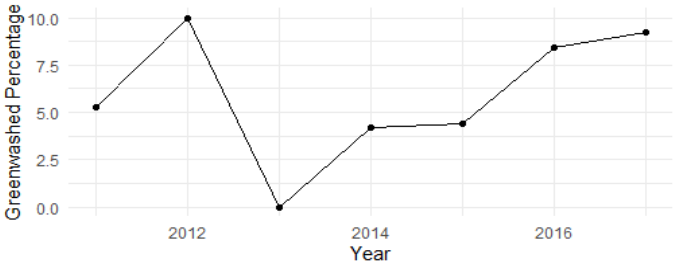
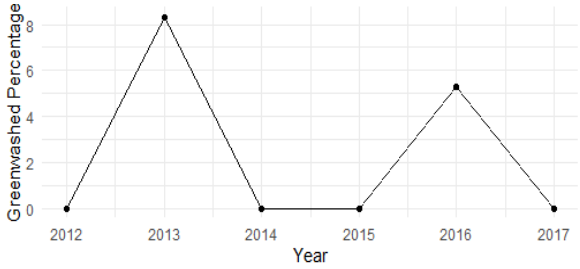


Fig 7: Greenwashing by Year (Computers)



3.2 Greenwashing by Region

- Latin America, the Caribbean and Northern America seem to be having high levels of Greenwashing (Figure 8). For example, high levels of greenwashing are observed in Brazil.
- However, Figure 9 shows that Greenwashing trends by year are slightly different. Greenwashing is highest in Oceania followed by the Americas and lowest in Africa, Europe and Asia.

Fig 8: Total Greenwashing by Region

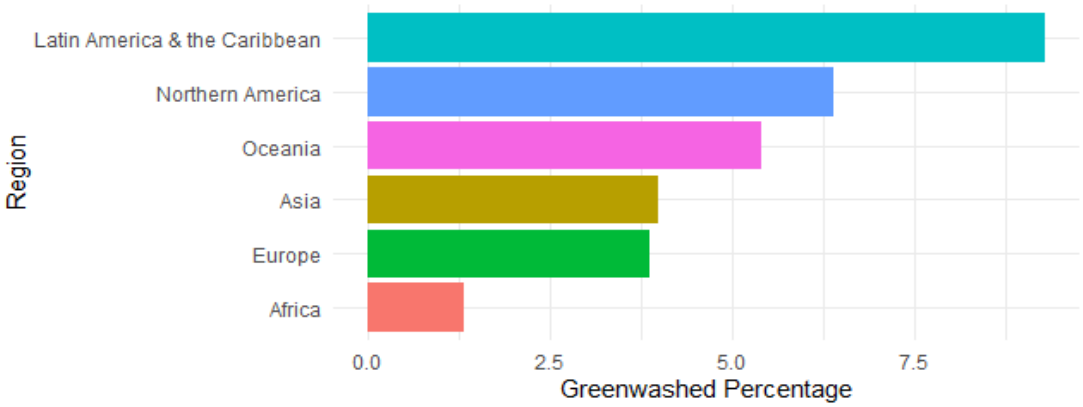
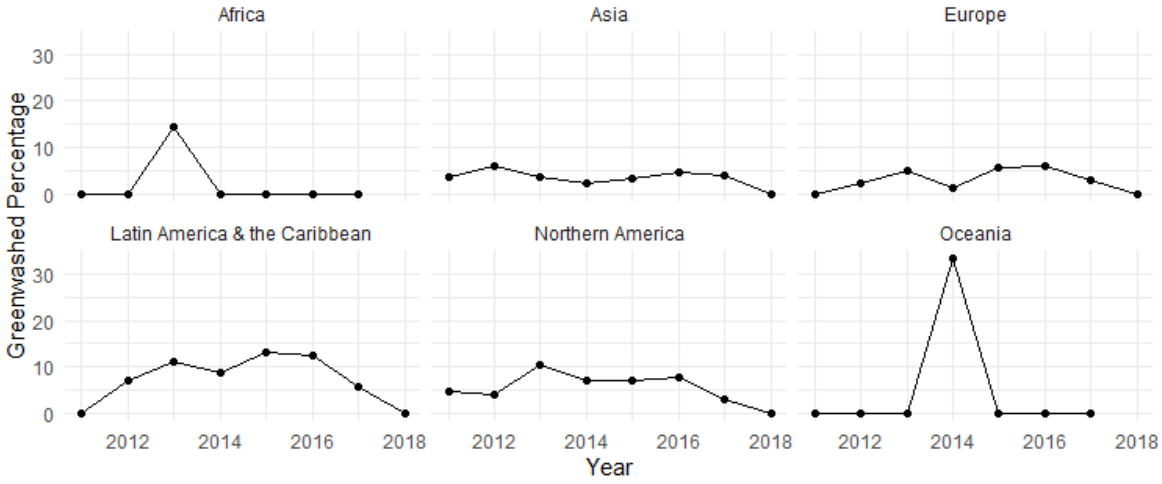


Fig 9: Greenwashing by Region by Year



3.3 Greenwashing by Company Size

- The multinational enterprises seem to have the highest percentage of greenwashing. However, the variations of greenwashing across company size are not high (Figure 10).
- Figure 11 shows a trend of 2 peaks among all categories. The first peak between 2011 and 2014 and the second peak between 2015 and 2018.

Fig 10: Total Greenwashing by Company Size

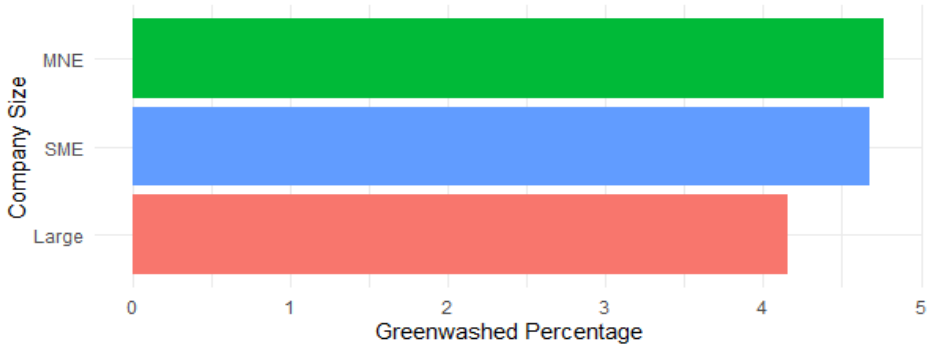
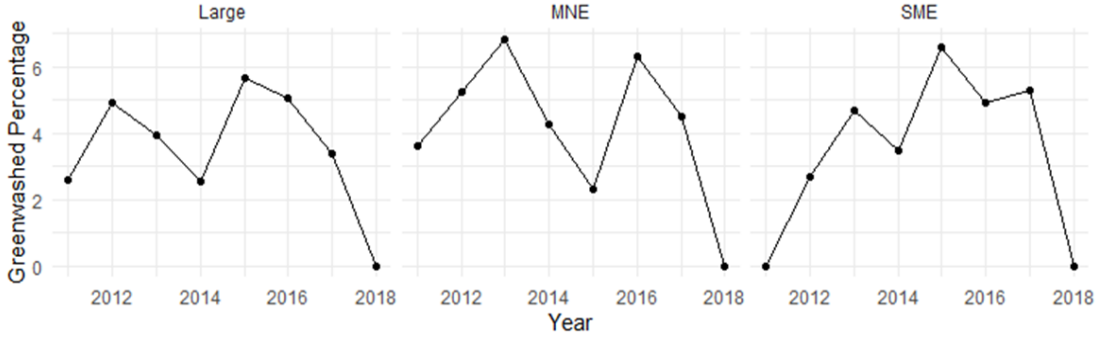


Fig 11: Greenwashing by Company Size by Year



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4 Discussion:

We attempted to capture greenwashing by analyzing the cover pages of CSR Reports. A trend commonly observed across multiple graphs is the phenomena of 2 peaks between 2011 and 2014 and between 2015 and 2018. Rise in ESG Ratings and policy changes across multiple countries led to adoption of CSR which also led to greenwashing between 2011 and 2014. In 2014 **EU Non-Financial Reporting Directive** was implemented which **r**equired large public companies to disclose **environmental and social impacts** which may have reduced greenwashing. From 2015 to 2018, Sustainable Development Goals (Agenda for 2030) were adopted which again led to an increase in greenwashing in CSR.

5 Conclusion:

Greenwashing has increased significantly in the last decade. Regions with higher greenwashing percentages may need to strengthen environmental regulations and enforcement to ensure transparency in CSR reporting. Companies should focus on authentic sustainability efforts rather than misleading by portrayal of sustainability in their reports. Consumers and investors should be cautious and verify if the companies portray themselves truthfully (e.g., third-party certifications). Addressing greenwashing will require stronger regulations, greater transparency, and increased consumer and investor scrutiny.

Reference List

Lyon, T. P. and Montgomery, A. W. (2015) 'The Means and End of Greenwash', *Organization & Environment*, 28(2), pp. 223-249.

United Nations (2023) *Greenwashing: The New Threat to Genuine Environmental Efforts*. United Nations.

United Nations (2015) *Transforming our world: The 2030 Agenda for Sustainable Development*. https://sdgs.un.org/2030agenda.

United Nations (2015) *Corporate Sustainability and Environmental Claims*. United Nations.

United Nations (2024) *Greenwashing – The Deceptive Tactics Behind Environmental Claims*. United Nations. https://www.un.org.

Williams, J. (2024) 'Greenwashing: Appearance, illusion, and the future of "green" capitalism', *Geography Compass*, 18(1). https://doi.org/10.1111/gec3.12736.

Walker, K. and Wan, F. (2012) 'The harm of symbolic actions and green-washing: Corporate actions and communications on environmental performance and their financial implications', *Journal of Business Ethics*, 109(2), pp. 227-242. https://doi.org/10.1007/s10551-011-1122-4.

Woloszyn, L., Alvarado, T. and Foster, J. (2021) 'Artificial intelligence for detecting fraudulent environmental claims', *Journal of Business Ethics*, 169(4), pp. 715-728.