This paper was presented at the 21st International Conference on Sustainable Development, held at the Faculty of Social Science and Humanities, University of Ottawa, Ottawa, Canada, on July 15-16, 2025

Comparative Analysis of Sustainability Reports of Major Cosmetic Companies using Opinion Mining Artificial Intelligence

Karina Magro Machado [1*], Robert W. Taylor [2]
[1,2] Department of Earth and Environmental Studies,
Montclair State University, 1 Normal Ave, Montclair, NJ 07043, USA.
* Corresponding Author: magromachadk1@montclair.edu

OIDA International Journal of Sustainable Development, Ontario International Development Agency, Canada.
ISSN 1923-6654 (print) ISSN 1923-6662 (online) www.oidaijsd.com
Also available at https://www.ssrn.com/index.cfm/en/oida-intl-journal-sustainable-dev/

Abstract: This study investigates the sustainability policies of four major cosmetics companies—Coty, Estée Lauder, Procter & Gamble, and Shiseido—by conducting a sentiment analysis, also known as opinion mining artificial intelligence, of corporate sustainability reports from 2019 to 2023. The study focuses on waste management, carbon emission reductions, sustainable packaging, and social sustainability, which includes gender equity, inclusiveness, and internal/external communication strategies. Sentiment analysis found a significant emphasis on positive successes, which frequently overshadowed issues, raising questions about openness. In recent years, the cosmetics industry's sustainability reporting has experienced considerable changes. What began as broad statements of intent and commitments has evolved into detailed, data-driven disclosures that emphasize transparency and measurable outcomes. Reports now focus more on aligning with global sustainability frameworks such at the Sustainable Development Goals (SDGs) and providing concrete metrics to track progress, reflecting the growing importance of environmental stewardship in the sector. The findings highlight the need for balanced reporting and the use of powerful artificial intelligence tools to connect sustainability initiatives to global outcomes. The report makes concrete recommendations to improve sustainability practices and responsibility in the cosmetics business, therefore contributing to a greater environmental and social impact.

Keywords: Carbon emissions; circular economy; cosmetics industry; sustainability; waste management.

Introduction

The Federal Food, Drug, and Cosmetic Act (FD&C Act) defines cosmetics as "articles intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body...for cleansing, beautifying, promoting attractiveness, or altering the appearance" [FD&C Act, sec. 201(i)] [1]. These products have become integral to modern self-care and wellness routines, fueling a thriving global industry. Despite economic fluctuations, the cosmetics sector has shown remarkable resilience and continuous growth since 2004, even when the Covid-19 pandemic caused a brief slowdown in 2020 [2]. It is anticipated that this industry would reach a global revenue close to 736 billion United States dollars (USD) by 2028 [3]. Skincare alone is expected to account for USD 590 billion of the total revenue, driven by innovations such as "skinification", the incorporation of skincare actives into cosmetic products, which is leading current customer trends [4].

Multinational corporations like L'Oréal, Unilever, Procter & Gamble, the Estée Lauder Companies, Shiseido, and Beiersdorf are at the forefront of this market. With more than USD 44 billion in revenue, L'Oréal was the top beauty firm in the world in 2023. With a market value of around USD 48 billion, the L'Oréal Paris brand was the most valuable personal care brand globally. These numbers demonstrate how the beauty business may grow and evolve with the tastes of customers throughout the world [2]. However, this rapid expansion comes with significant environmental challenges. Every stage of cosmetic production, from raw material extraction to manufacturing, packaging, and disposal, contributes to waste generation, pollution, and resource depletion [5]. The cosmetics and personal care industries have a significant environmental impact because they rely on chemical processes, energy-intensive manufacturing, and the considerable use of packaging materials [6]. According to the U.S. Environmental

Protection Agency, the beauty industry generates approximately 120 billion packaging units annually, contributing significantly to global landfill waste and methane emissions.

Water usage and pollution are also major concerns. Many cosmetic formulations, contain up to 95% of water and require substantial water inputs for formulation, equipment cleaning, and packaging. In addition, chemical waste from cosmetic production and consumer use phase, especially surfactants, UV filters, and microplastics can damage aquatic ecosystems and human health [6]. Air pollution is also an issue as volatile organic compounds (VOCs) found in fragrances interact with atmospheric particles, forming pollutants that harm air quality and human health [6]. Given these environmental impacts caused by this industry, there is an urgent need for this sector to adopt more sustainable practices and improve transparency in their sustainability communication.

Sustainability reporting has undergone a significant transformation over the past few decades. Over the years, there has been a tremendous revolution in sustainability reporting. Its development has followed a consistent trend, moving from spontaneous and unstructured disclosures to more comprehensive and regulated practices that reflect growing pressure from institutions and consumer demands [7]. In the 1970s, stakeholder interest in nonfinancial information was relatively low, but it has since increased dramatically, leading to regulation and helping to create a more comprehensive and wide-ranging sustainability reporting environment [8]. Today sustainability reporting is a key tool through which companies report exhibit their environmental, social, and governance (ESG) initiatives. While reports used to consist of vague commitments and aspirational language, today's reports are more organized, data-driven publications associated with international frameworks such as the United Nations Sustainable Development Goals (SDGs). [9]. Many leading brands started to implement practices to reduce carbon emissions, reduce plastic use, manage waste, and promote social sustainability through inclusive hiring and gender equity initiatives [10].

As an important element of the economy, with projected growth in the coming years, cosmetic companies are seeking to minimize their environmental, social and economic footprints to align with the United Nations Sustainable Development Goals [5]. While many companies have been adopting sustainable practices there are still many challenges. High costs of sustainable raw materials, supply chain complexities, limited regulatory enforcement, and the risk of greenwashing [1] continue to challenge progress [12]. Therefore, understanding how companies communicate their sustainability efforts and whether their messaging reflects genuine progress or strategic marketing, has become increasingly important.

However, while the content of these reports has been studied extensively, less attention has been paid to the tone and framing used in corporate disclosures, how companies choose to position their sustainability efforts, and which themes are emphasized or downplayed over time. This study fills this gap by using qualitative coding and sentiment analysis, a text mining technique used to determine the emotional tone of language in a text. It classifies the content as positive, negative, or neutral, and can also detect uncertainty or emphasis, offering insights into how companies frame their narratives. It has been widely applied in consumer and political research and more recently, in sustainability studies, as a tool to assess corporate transparency and stakeholder communication [13]. By applying this method, we evaluate whether cosmetic companies emphasize their environmental and social performance, and how this balance has shifted over time.

To explore this, we used NVivo software to examine the sustainability reports of four major cosmetic companies—Coty, Estée Lauder, Procter & Gamble, and Shiseido—between 2019 and 2023. Three environmental themes, waste management, carbon emissions, and sustainable packaging, and three social themes, gender equity, inclusion, and internal/external communication, were analyzed. The analysis examines how sentiment within and between these two categories has changed over time, offering a deeper understanding of corporate sustainability messaging in the cosmetic industry.

This research addresses the following research questions: (1) How has the sentiment shifted between the three environmental variables from 2019 to 2023?; (2) How has the sentiment shifted between the three social variables from 2019 to 2023?; and (3) How has the sentiment shifted between environmental and social variables from 2019 to 2023?

[1] Defined as "The act or practice of making a product, policy, activity, etc. appear to be more environmentally friendly or less environmentally damaging than it really is" [11].

This study advances our knowledge of how businesses in the cosmetic sector convey their belief and advancements by analyzing sustainability reports tone as well as their content. The findings offer a critical perspective for analyzing sustainability narratives and can assist stakeholders in distinguishing genuine efforts from marketing strategies.

Materials and Methods

To analyze how sustainability reports have changed on environmental sustainability and how sentiment analysis has evolved regarding social and environmental sustainability communication, a structured qualitative methodology was applied. To ensure thoroughness and accuracy, the methodology for reviewing and comparing sustainability reports followed a methodical approach. The primary data sources were four major cosmetics companies' sustainability reports from 2019 to 2023: Coty, Estée Lauder, Procter & Gamble, and Shiseido. These reports were selected because they provide a comprehensive review of environmental practices, objectives, and accomplishments. To streamline the analysis, the documents were translated to the proper formats (PDF or Word) and uploaded to NVivo, ensuring consistent layout and organization.

Cases were created inside NVivo for each organization, and each document was allocated features such as year and report type to improve categorization. A thematic classification scheme was developed based on common themes in the papers and research aims. The main subjects mentioned included waste management, carbon emissions, and packaging, general sustainability goals, and social sustainability. Sub-codes were assigned to each theme to capture specific facts, such as recycling rates under waste management or renewable energy projects under carbon emissions. This rigorous coding methodology allowed for the systematic extraction of relevant data from each report.

NVivo's manual coding tools were utilized to go through the sustainability reports line by line. Relevant text and data were highlighted and assigned to the appropriate themes and subcodes. Text queries (see Appendix) were run across all reports to find important terms assuring complete coverage. This method enabled a systematic identification and recording of all allusions to essential concepts. Additionally, NVivo's matrix coding queries were used to compare themes across organizations and years. These queries produced tables outlining the prevalence and intensity of concentration on specific themes, allowing for a comparative analysis of trends and methods. The tables created in NVivo were exported to Excel for further analysis and visualization, allowing for the construction of graphs to demonstrate critical findings.

A sentiment analysis was included in the technique to evaluate the tone of sustainability communications. Positive, neutral, and negative feelings were defined and categorized according to the language used in the reports. Positive attitudes are represented in language stressing accomplishments and development, such as "zero waste-to-landfill" or "on track to meet our objectives." Neutral feelings are factual, objective statements that lack emotive or evaluative terminology, such as "the company implemented a recycling program in 2023." Negative attitudes emphasize problems or failures, such as "struggled to meet recycling targets." (see Appendix). A matrix coding query was then used to compare the distribution of feelings among organizations, indicating both their strategic focus and communication style. This layer of research provided insights into how organizations framed their progress and difficulties, which enriched the theme analysis.

Graphs were created using NVivo's visualization features, highlighting trends over time and contrasts between organizations. Bar charts, for example, showed shifts in waste management focus among the four firms over a five-year period. In addition, sentiment distribution was depicted using bar charts to provide a clear grasp of the tonal disparities in sustainability reporting. These graphic outputs were effective communication tools, highlighting trends and differences between organizations.

The NVivo analysis revealed major sustainability trends, including a greater emphasis on circular economy principles. Furthermore, it found disparities between organizations, with some exhibiting leadership in areas such as waste management and carbon emissions reduction, while others made slower progress toward ambitious sustainability targets. This comparison research revealed industry leaders and less advanced companies, giving a standard for evaluating overall industry performance.

The methodology was iterative throughout, with the coding structure being improved in response to new themes in the data. Cross-checking was carried out to guarantee consistency and correctness in coding and interpretation. This methodical and comprehensive approach allowed for a detailed comparative analysis of sustainability projects, leading to significant insights into industry trends, best practices, and areas for improvement. The findings provided a solid framework for practical recommendations to improve sustainability practices in the cosmetics business.

Results

The NVivo analysis, which used data from sustainability reports, revealed significant trends in waste management, carbon emissions reduction, sustainable packaging practices, and social sustainability, such as gender equity, inclusiveness, and communication at Coty, Estée Lauder, Procter & Gamble, and Shiseido. The findings represent how environmental and social sustainability reporting have evolved, as well as sentiment analysis in relation to social and environmental sustainability communication. Graphs have been provided to offer detailed numerical insights together with visual trends.

The figures below illustrate each company's reporting focus intensity over time in three key environmental areas, waste management, carbon emissions, and sustainable packaging, and three major social themes: gender equality, inclusion, and communication. These graphs allow for a comparative analysis of how the emphasis on each issue changed between 2019 and 2023.

As shown in Figure 1, in terms of environmental sustainability, Estée Lauder demonstrated a consistent and growing focus on waste management, outperforming other companies in 2021 and 2022. Procter & Gamble led in 2019 and 2020 but dramatically decreased its focus in subsequent years. Shiseido showed consistent improvement in reporting intensity across all three environmental categories, particularly waste management and sustainable packaging. In contrast, Coty maintained a relatively modest degree of reporting concentration throughout the time, with just minor fluctuations.

Carbon emissions were a relatively low priority for all companies compared to other environmental issues. However, Estée lauder once again stood out with a clear upward trend, while the other remained reasonably stable with minor alterations.

Estée Lauder commitment to ecological packaging remained strong with minor fluctuations. Despite taking an early lead in 2019 and 2020, Procter & Gamble later reduced its reporting intensity in this area.

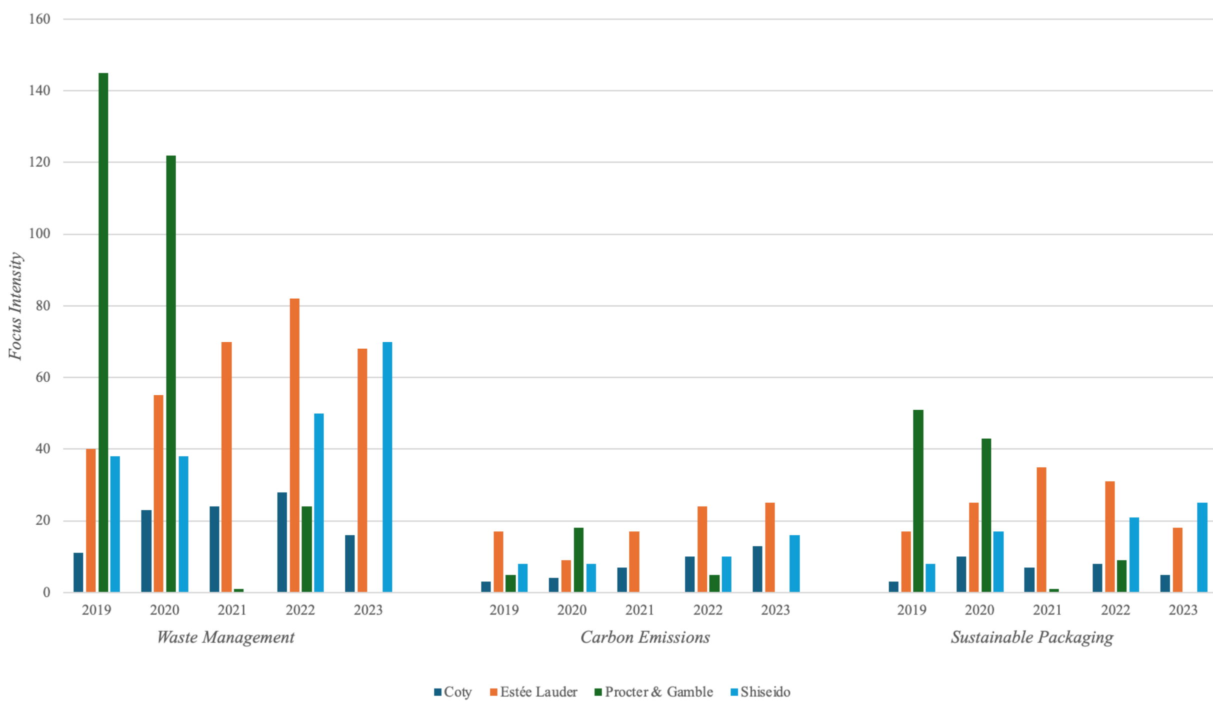

Figure 1: Environmental Sustainability Focus Intensity (2019-2023).

Figure 2, which focuses on social sustainability, shows that Procter & Gamble began with a particularly high emphasis on gender equality in 2019 but has drastically decreased its focus in future years. Meanwhile, both Estée Lauder and Shiseido showed consistent growth, with Shiseido reaching its peak reporting intensity by 2023. Inclusion, despite garnering less emphasis overall, followed similar trajectory, Estée Lauder maintained a relatively strong and constant concentration, whereas Coty and Shiseido remained less intense during the five-year period.

Communication, both internal and external, showed more consistent attention across the companies. Procter & Gamble led in 2020 with the highest reporting intensity, though its focus drastically declined in later years. Estée Lauder maintained consistently high attention throughout, while Coty and Shiseido demonstrated gradual increases but remained a lower levels compared to the other two.

These reporting trends indicate diverging strategic priorities and shifting commitments to environmental and social challenges, which will be discusses in further depth in the discussion section.

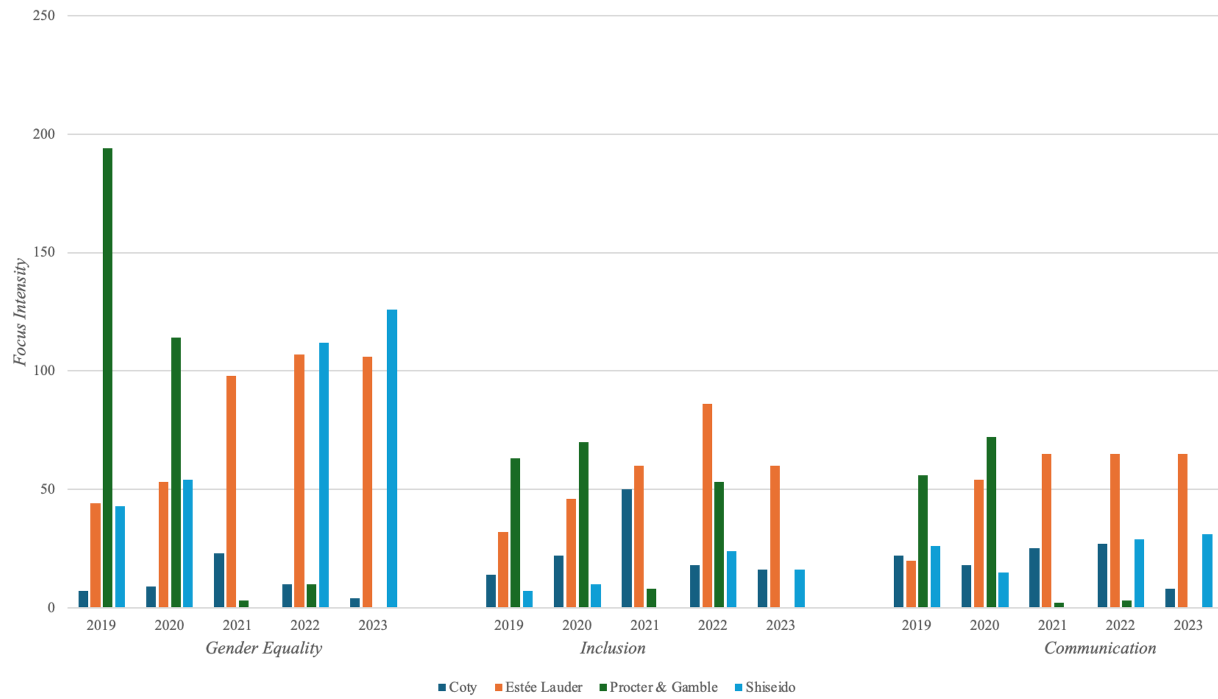

Figure 2: Social Sustainability Focus Intensity (2019-2023).

In addition to the focus intensity analysis, sentiment analysis was also used to assess the tone of sustainability disclosures. As illustrated in Figure 3, the majority of references in the reports were classified as positive, with only a few instances of negative and none of neutral. This tendency indicates that companies generally portray their sustainability projects in a positive manner, emphasizing accomplishments and progress while perhaps underreporting challenges or opportunities for improvement.

Such a strong bias toward positive language might influence public perception and stakeholder trust, but it can also raise questions about the transparency and balance of corporate sustainability communication, which are discussed further in the discussion section.

Next Page

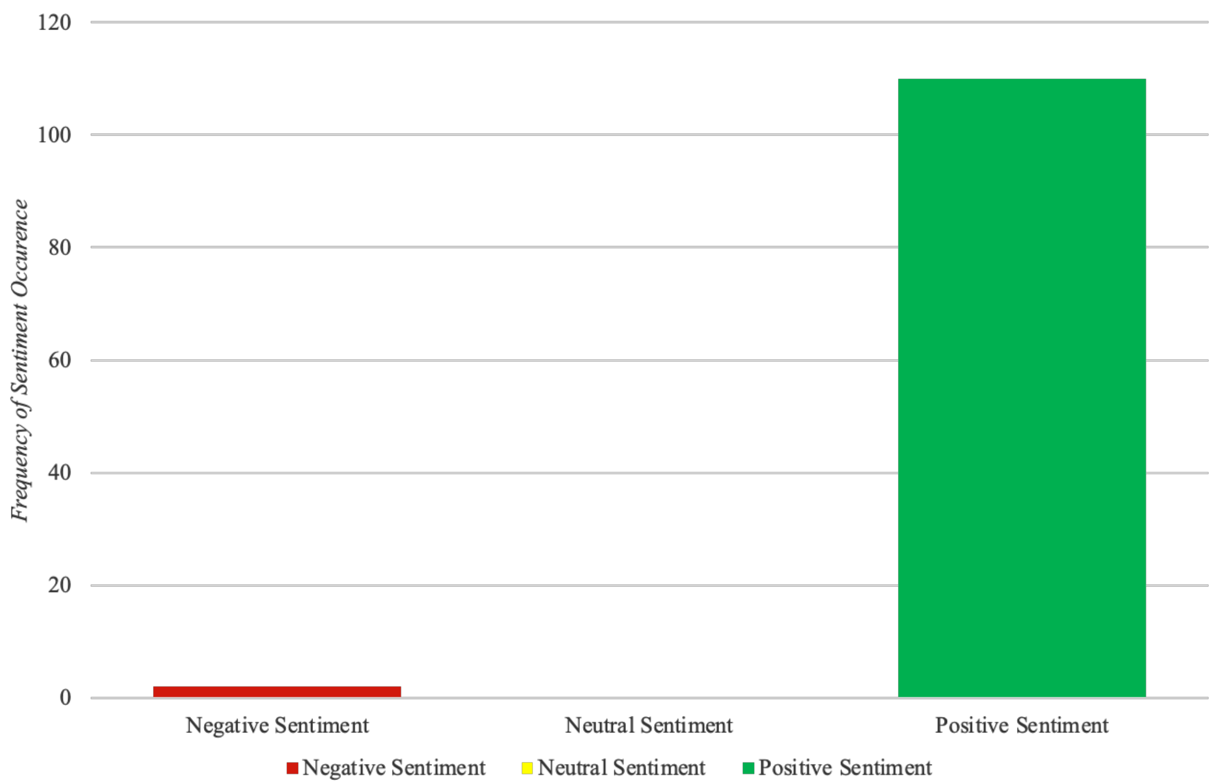

Figure 3: Sentiment distribution across all sustainability reports.

Discussion

The outcomes of this study show how sustainability communication evolved in the cosmetic business during a five-year period (2019-2023). The initial research found an increased focus on environmental issues such as waste management, carbon emissions, and sustainable packaging. However, the amount of attention paid to each area varied by company and year. Estée Lauder and Shiseido emerged as constant leaders in environmental reporting, while Procter & Gamble and Coty shown varying levels of engagement. Social sustainability issues, such as gender equality, inclusion, and communication have also attracted attention throughout time. Estée Lauder once again distinguished out for its consistent focus and growth, while other corporations showed more inconsistent or delayed reporting trends. These changes reflect the industry's increased understanding of the importance of aligning with global sustainability objectives and stakeholder expectations, although consistency and transparency remain as a challenge.

Sentiment analysis revealed a strong and consistent preference for positive language across all reports and companies, particularly in the environmental categories. Expressions such as "achieved," "on track," and "recognized leadership" were commonly utilized to describe sustainability initiatives as successful and forward-thinking, but neutral and negative tone was rarely used when describing delays, missed targets, or unresolved issues. This emphasis on positive language implies that sustainability reports in this industry are mostly influenced by promotional efforts rather than critical self-reflection. Furthermore, it may indicate a company's failure to communicate unfulfilled objectives.

In the social sustainability categories, the tone remained hopeful, but with significantly greater variety. Some firms displayed better early adoption, while others have increased their attention in recent years. Compared to environmental issues, social sustainability reporting had a more neutral tone, particularly when detailing internal policies or inclusion programs. However, critical language was limited, and negative feeling was nearly nonexistent. Overall, environmental issues were described more consistently in positive terms, frequently supported by quantitative goals, whereas social issues had more tone variation and tended to emphasize on values and commitments.

When comparing environmental and social themes, clear patterns emerge. As seen in the results section, environmental concerns were more consistently reported throughout time and among firms, with certain brands, such as Estée Lauder and Shiseido, maintaining or expanding their focus. Social topics such as gender equality, inclusiveness, and communication gained exposure but varied in severity. Figure 3, which depicts general attitudes across all subjects, emphasizes that the tone of sustainability reporting is predominantly positive. However, based on the language used in the reports, environmental disclosure tended to focus on quantitative successes, such as emission reductions or packaging improvements, whereas social issues were frequently presented in larger, value-driven narratives.

This suggests that businesses communicate more assertively and directly about environmental success, while addressing social sustainability with caution and principle-based marketing.

These findings highlight the need for more fair and honest communication in sustainability reporting. Companies should not just showcase accomplishments, but also recognize obstacles, limitations, and opportunities for progress. In doing so, companies would gain trust and better connect with stakeholder needs for authenticity. Standardized sustainability reporting frameworks, such as those developed by the Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB), have the potential to increase industry uniformity and comparability.

Furthermore, greater effort should be put into strengthening social sustainability metrics like gender equality, inclusivity, and communication. To boost impact, cosmetic companies should strengthen their commitment to fair practices at all levels of the organization and expand stakeholder engagement approaches. Incorporating sentiment analysis tools into internal reporting audits may help detect tone bias and reduce the likelihood of greenwashing. Companies that commit to transparency and accountability will be better positioned to dominate in a highly competitive and environmentally concerned market.

While this research provides valuable insights, it is constrained by its dependence on publicly available records, which may not accurately reflect internal issues or unrecorded sustainability initiatives. Furthermore, despite the fact that NVivo supports sentiment interpretation, linguistic context and structure have an intrinsic impact on it. Future research might build on this work by using stakeholder interviews, third-party audits, or consumer impressions to give a more comprehensive assessment of sustainability communication efficacy.

Conclusion

This study looked at how sustainability reporting in the cosmetics business changed between 2019 and 2023 by studying the language and tone used in corporate disclosures from Coty, Estée Lauder, Procter & Gamble, and Shiseido. NVivo-based thematic and sentiment analysis found unique patterns in environmental focus, particularly waste management, carbon emissions, and sustainable packaging, as well as increased emphasis to social sustainability issues such as gender equality, inclusiveness, and communication strategies.

The findings show that, although some organizations have showed constant development and transparency, others have fallen behind in reporting intensity or emphasized wins over issues. Sentiment analysis found a substantial bias for positive messaging across all firms, with few neutral or negative disclosures. Although a positive framing may help a brand's image, it may also harm transparency and credibility.

To address this, the study suggests implementing more open and fair reporting techniques, using standardized frameworks, and using analytical tools like sentiment analysis to increase the accuracy and credibility of corporate communications.

Overall, this study adds to the developing area of sustainability communication by emphasizing the importance of sentiment analysis as a tool for evaluating tone bias and framing in corporate reporting. Cosmetic companies may increase stakeholder trust, create genuine responsibility, and contribute more meaningfully to environmental and social change by improving the content and tone of sustainability reports. As sustainability requirements improve, organizations that prioritize honest evaluation alongside successes will be better positioned to lead in a competitive and environmentally conscious marketplace.

References

[1] U.S. Food & Drug Administration. (2024, September 11). *Is It a Cosmetic, a Drug, or Both? (Or Is It Soap?).* https://www.fda.gov/cosmetics/cosmetics-laws-regulations/it-cosmetic-drug-or-both-or-it-soap#:~:text=The%20Federal%20Food%2C%20Drug%2C%20and,%22%20%5BFD%26C%20Act%2C%20sec.
[2] Petruzzi, D. (2024, September 3). Topic: Cosmetics industry. Statista.
[3] Carter, P. (2024, April 8). *The Beauty Industry's boom.* globalEDGE: Your source for global business knowledge. https://globaledge.msu.edu/blog/post/57407/the-beauty- industry%27s-boom

[4] Weaver, K., Lesko Pacchia, M., Hudson, S., Wolfer, A., Saint Olive, A., & Zampouridis, A. (2024, September 11). *The beauty boom and beyond: Can the industry maintain its growth?.* McKinsey & Company. https://www.mckinsey.com/industries/consumer- packaged-goods/our-insights/the-beauty-boom-and-beyond-can-the-industry-maintain- its-growth
[5] Mondello, A., Salomone, R., & Mondello, G. (2024). Exploring circular economy in the cosmetic industry: Insights from a literature review. *Environmental Impact Assessment Review*, *105*, 107443. https://doi.org/10.1016/j.eiar.2024.107443
[6] Lim, H. Y., & Kwon, K. H. (2023, September 5). Sustainable assessment of the environmental activities of major cosmetics and personal care companies. *Sustainability, 15*, 13286. https://doi.org/10.3390/su151813286
[7] Gokten, S., Ozerhan, Y., & Gokten, P. O. (2020). The historical development of sustainability reporting: a periodic approach. *Zeszyty Teoretyczne Rachunkowości*, *107*(163), 99–117. https://doi.org/10.5604/01.3001.0014.2466
[8] Gutterman, A. S. (2024, May 1). *The Long Journey and Evolution of Sustainability Reporting*. LinkedIn. https://www.linkedin.com/pulse/long-journey-evolution-sustainability-reporting-alan-s-gutterman-202xc/
[9] KPGM. (2022). *Big shifts, small steps.* https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2022/10/ssr-small-steps-big-shifts.pdf
[10] Ellen MacArthur Foundation. (2024). *The Global Commitment 2024: Progress Report.* https://content.ellenmacarthurfoundation.org/m/528a7cd095787dec/original/The-Global-Commitment-2024-Progress-Report.pdf?_gl=1*1x9vh93*_gcl_au*MjkxNjU1ODAyLjE3NDc4NDEyMTY.*_ga*OTU0NTExMTQ5LjE3NDc4NDEyMTY.*_ga_V32N675KJX*czE3NDc4NDU3OTEkbzIkZzEkdDE3NDc4NDY2MjQkajM5JGwwJGgwJGR6U3daVmpwdmowbkluTWdPTGhMcG1BODZPMDRvYVQ2SUl3
[11] Merriam-Webster. (2025). Greenwashing. *In Merriam-Webster.com dictionary*. Retrieved May 21, 2025, from https://www.merriam-webster.com/dictionary/greenwashing
[12] Rocca, R., Acerbi, F., Fumagalli, L., & Taisch, M. (2022). Sustainability paradigm in the cosmetics industry: State of the art. *Cleaner Waste Systems, 3*, 100057. https://doi.org/10.1016/j.clwas.2022.100057
[13] Mućko, P. (2021). Sentiment Analysis of CSR disclosures in annual reports of EU Companies. Procedia Computer Science, 192, 3351–3359. https://doi.org/10.1016/j.procs.2021.09.108
[14] Coty, Inc. (2019). *FY19 Sustainability & Assurance Reports.* Retrieved from https://www.coty.com/sustainability/policies-reports
[15] Coty, Inc. (2020). *FY20 Sustainability Report.* Retrieved from https://www.coty.com/sustainability/policies-reports
[16] Coty, Inc. (2021). *FY21 Sustainability Report.* Retrieved from https://www.coty.com/sustainability/policies-reports
[17] Coty, Inc. (2022). *FY22 Sustainability Report.* Retrieved from https://www.coty.com/sustainability/policies-reports
[18] Coty, Inc. (2023). *FY23 Sustainability Report.* Retrieved from https://www.coty.com/sustainability/policies-reports
[19] Estée Lauder. (2019). Corporate Responsibility Report. Retrieved from https://www.elcompanies.com/en/news-and-media/media-resources/resources-and-reports
[20] Estée Lauder. (2020). Citizenship & Sustainability Report. Retrieved from https://www.elcompanies.com/en/news-and-media/media-resources/resources-and-reports
[21] Estée Lauder. (2021). Social Impact & Sustainability Report. Retrieved from https://www.elcompanies.com/en/news-and-media/media-resources/resources-and-reports
[22] Estée Lauder. (2022). Social Impact & Sustainability Report. Retrieved from https://www.elcompanies.com/en/news-and-media/media-resources/resources-and-reports
[23] Estée Lauder. (2023). Social Impact & Sustainability Report. Retrieved from https://www.elcompanies.com/en/news-and-media/media-resources/resources-and-reports
[24] Procter & Gamble. (2019). 2019 Citizenship Report. Retrieved from https://us.pg.com/sustainability-reports/
[25] Procter & Gamble. (2020). 2020 Citizenship Report. Retrieved from https://us.pg.com/sustainability-reports/
[26] Procter & Gamble. (2021). 2021 Citizenship Report. Retrieved from https://us.pg.com/sustainability-reports/
[27] Procter & Gamble. (2022). 2022 Citizenship Report. Retrieved from https://us.pg.com/sustainability-reports/
[28] Shiseido. (2019). Sustainability Report. Retrieved from https://corp.shiseido.com/en/sustainability/report.html
[29] Shiseido. (2020). Sustainability Report. Retrieved from https://corp.shiseido.com/en/sustainability/report.html
[30] Shiseido. (2021). Sustainability Report. Retrieved from https://corp.shiseido.com/en/sustainability/report.html
[31] Shiseido. (2022). Sustainability Report. Retrieved from https://corp.shiseido.com/en/sustainability/report.html

[32] Shiseido. (2023). Sustainability Report. Retrieved from https://corp.shiseido.com/en/sustainability/report.html

Appendix: NVivo Coding Structure

NVivo Coding Structure

Sustainability Practices

Waste Management

- **Code Name**: Waste Management
    - **Keywords**: "waste diversion", "zero-waste goals", "recycling rates", "circular economy", "landfill reduction", "upcycling initiatives", "hazardous waste disposal", "waste-to-energy", "compostable materials", "material recovery", "extended producer responsibility", "waste auditing", "recycling innovations", "organic waste solutions", "zero-waste certifications", "zero waste to landfill".

Sustainable Packaging

- **Code Name**: Sustainable Packaging
    - **Keywords**: "biodegradable materials", "recyclable packaging", "recycled content", "lightweight materials", "mono-material packaging", "reusable containers", "eco-design principles", "circular packaging", "post-consumer waste packaging", "compostable packaging", "bioplastic alternatives", "sustainable inks and dyes", "renewable packaging resources", "closed-loop systems for packaging", "design for recyclability", "reduced plastic use".

Carbon Emissions Reduction

- **Code Name**: Carbon Emissions Reduction
    - **Keywords**: "carbon neutrality", "CO_2 reduction", "renewable energy", "emissions targets", "Scope 1 emissions", "Scope 2 emissions", "Scope 3 emissions", "decarbonization", "carbon capture", "greenhouse gas inventory", "low-carbon technologies", "energy transition", "science-based targets", "sustainable transport", "fleet electrification".

Social Sustainability

Gender Equality

- **Code Name:** Gender Equality
    - **Keywords**: "gender equality", "gender parity", "women", "pay parity", "support women in advancing to leadership roles", "equal opportunities for women and underrepresented groups", "gender-inclusive", "women entrepreneurs", "female representation".

Inclusion

- **Code Name**: Inclusion
    - **Keywords**: "inclusion", "inclusive workplace", "inclusive culture", "workplace inclusion", "creating inclusion", "commitment to inclusion", "fostering inclusion", "sense of belonging", "inclusive environment", "employee inclusion initiatives", "inclusion goals", "community inclusion", "supplier inclusion", "inclusive supply chain", "including marginalized groups", "inclusion in leadership", "representation and inclusion".

Internal and External Communication

- **Code Name**: Internal and External Communication
    - **Keywords**: "employee engagement", "sustainability training", "employee involvement", "workplace initiatives", "internal awareness programs", "internal policies", "sustainability guidelines", "code of conduct", "corporate culture", "leadership communication", "internal collaboration", "employee feedback", "cross-department initiatives", "sustainability team", "sustainability champions", "green teams", "employee responsibility".

Sentiment Analysis

- **Code Name**: Sentiment Analysis
  - **Positive Keywords**: “achieved”, “on track”, “exceeded benchmarks”, “pioneering efforts”, “recognized leadership”, “accelerated efforts”, “breakthrough achievement”, “transformative progress”.
  - **Neutral Keywords**: “initiated”, “aligned with goals”, “reported performance”, “policy updates”, “baseline assessments”, “described approach”, “adopted measures”, “current status”.
  - **Negative Keywords**: “fell short of goals”, “faced delays”, “unsatisfactory results”, “resource constraints”, “stakeholder concerns”, “high-impact challenges”, “limited scope of initiatives”, “cost overruns”.

About the authors

Name: Karina Magro Machado
Karina Magro Machado is a recent graduate of the Master’s program in Sustainability Science at Montclair State University. Her work focuses on environmental sustainability in the cosmetics industry, where she uses tools such as Life Cycle Assessment (LCA) and sentiment analysis to evaluate the environmental and social impacts of products and corporate sustainability communication. She will begin my Ph.D. in Environmental Science and Management at Montclair in Fall 2025, where she plans to continue researching sustainable production systems, environmental policy, and corporate responsibility.
E-mail: kmagromachado@gmail.com

Name: Robert W. Taylor
Dr. Robert W. Taylor is a professor of Organizational and Urban Sustainability in the Department of Earth & Environmental Studies and Coordinator of the M.S. in Sustainability Science - Sustainability Leadership. A member of the Doctoral Faculty mentoring PhD students in environmental management. His expertise is in partnering with communities, companies, and universities to develop sustainability projects that drive green business growth, support climate adaptation, reduce poverty, and advance academic programs in Sustainability.
Tel: (973) 655-4129
E-mail: taylorr@montclair.edu