



# A Three-Dimensional Discourse Analysis of SDGs Reports and Apple's Environmental Progress Reports: A Corpus-Based Study

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**Abstract.** The importance of the United Nations' Sustainable Development Goals (SDGs) is recognized globally. Analyzing sustainable development reports is a focus in quantitative linguistics. This study investigates the relationship between SDGs and corporate environmental progress reports using corpus-based and critical discourse analysis (CDA) methods. The analysis is conducted on SDGs Reports (SDGRs) and Apple's Environmental Progress Reports (AEPRs) from 2015 to 2022. Fairclough's three-dimensional analysis model is employed. The study examines high-frequency verbs, nouns, modal verbs, and outcomes of topic modeling. It explores discourse and social practices in the reports, highlighting companies' proactive approach to SDGs. The paper introduces new research perspectives and methodologies to linguistics and discourse analysis.

**Keywords:** sustainability report; corporate reporting; critical discourse analysis; environmental progress.

## 1 Introduction

This study focuses on Apple to examine the alignment between SDGs and corporate sustainability reports. The research aims to answer two questions: (1) What is the relationship between SDGs and corporate environmental progress reports? (2) What discourse strategies and semantic features are employed in these reports?

Drawing on a corpus-based study, the analysis integrates insights from various scholarly works. Anthony's AntConc software [1] serves as a fundamental tool for corpus analysis, contributing to the methodological framework of the study. Additionally, findings from diverse fields, such as audio-visual speech recognition [2], socially embedded vision and values in Russian universities [3], and critical discourse analysis applications [4], are synthesized to provide a multifaceted perspective. The examination extends to electrochemical determination [5], cross-cultural communication in the digital realm [6], critical discourse in media reports on the COVID-19 outbreak [7], and genetically modified seed discourse [8].

Furthermore, critical discourse analysis is applied to explore sustainability challenges in various contexts, including the Chilean science curriculum [9], Italian listed

companies [10], and banks' strategies [11]. The review also encompasses critical discourse studies in China [12]-[14]) and discourse-historical analysis of China-related COVID-19 coverage [15]. This extensive synthesis forms a rich foundation for understanding the complex interplay between sustainable development goals reporting and critical discourse analysis across diverse domains.

This paper introduces novel research perspectives and methodologies to the fields of linguistics and discourse analysis. Leveraging corpora and employing key discourse analysis methods, the study investigates the relationship between SDGs and corporate environmental progress reports, examining discourse strategies and semantic features employed in these reports.

## 2 Research design

### 2.1 Research corpus

**Table 1.** Corpus information table

Research corpus file name	Document source	Number of documents (year)	Tokens
Sustainable Development Goals Report	<a href="https://sdgs.un.org/">https://sdgs.un.org/</a>	8 (2015-2022)	221,556
Apple's Environmental Progress Report	<a href="https://www.apple.com/euro/environment">https://www.apple.com/euro/environment</a>	8 (2015-2022)	265,521

Note: The corpus data for analysis mentioned above were obtained from the official website cited. The data span from 2015 to 2022 and are in English. These datasets were downloaded and organized by the authors on July 14, 2023, from the aforementioned websites.

Table 1 shows the corpus information used in this paper. The reports were based on factual data and information, enhancing their authority and credibility. One report was issued by the United Nations, while the other originated from Apple, providing valuable insights into sustainable development.

### 2.2 Theoretical Framework and Research Steps

#### 2.2.1 Research Questions.

What is the relationship between SDGs and corporate environmental progress reports? What discourse strategies and semantic features are employed in these reports?

#### 2.2.2 Literature Research.

A comprehensive literature search was conducted, focusing on sustainability reporting, corporate reporting, critical discourse analysis (CDA), and environmental progress. Selected articles were analyzed to gather research findings related to SDGs and corporate environmental progress reporting.

### 2.2.3 Theoretical Basis.

This paper adopts Fairclough's three-dimensional analysis model, which examines discourse across text, discourse practice, and social practice dimensions. This model provides insights into how SDGRs function within specific contexts, reflect and shape social structures, and power dynamics. The analysis includes examining textual characteristics, exploring discourse strategies, and investigating societal and institutional influences on reporting practices.

### 2.2.4 Empirical Analysis.

Natural language processing techniques were employed on the research corpus using Python 3.8 programming language, with Jieba and Natural Language Toolkit libraries. Preprocessing steps included removing special symbols, restoring common abbreviations, and applying word segmentation, lemmatization, and word frequency analysis. The corpus analysis software AntConc 4.2.0 [1] was used to examine high-frequency verbs, nouns, modals, and perform topic modeling.

Discourse practice analysis focused on the United Nations SDGRs and the AEPRs.

Social practice analysis was conducted on the selected texts, with emphasis on the United Nations SDGRs and the AEPRs.

### 2.2.5 Discussion of Results.

**Table 2.** Top 20 high-frequency verb prototypes

Serial number	Sustainable Development Goals Report				Apple's Environmental Progress Report			
	High frequency verb	Frequency	Frequency (%)	Word length	High frequency verb	Frequency	Frequency (%)	Word length
1	be	5573	2.58	2	be	4237	1.65	2
2	increase	816	0.38	8	include	910	0.35	7
3	develop	713	0.33	7	recycle	909	0.35	7
4	make	280	0.13	4	reduce	515	0.20	6
5	rise	280	0.13	4	help	510	0.20	4
6	remain	273	0.13	6	create	471	0.18	6
7	ensure	256	0.12	6	provide	439	0.17	7
8	achieve	246	0.11	7	cover	336	0.13	5
9	reduce	240	0.11	6	require	274	0.11	7
10	require	205	0.10	7	come	262	0.10	4

Note: Data were collected by the author

As depicted in Table 2, specific high-frequency verbs such as "be," "increase," "develop," "reduce," "require," "improve," "achieve," and "take" find common usage in both SDGs and corporate environmental progress reporting. The linguistic consistency carries several notable implications for these reporting frame work.

### **3 Analysis of Discourse Practices**

#### **3.1 United Nations SDGRs**

The United Nations uses various discursive methods like reports, statements, and speeches to disseminate information and data on sustainable development. These practices aim to raise awareness, provide normative guidance, enhance public consciousness, and promote cooperation among countries and stakeholders. International legal documents, resolutions, and guidelines establish a framework for achieving SDGs, while public awareness campaigns and educational programs inform and motivate individuals. Initiatives, projects, and partnerships encourage collaboration and resource-sharing.

#### **3.2 Apple's Environmental Progress Reports (AEPRs)**

AEPRs employ discourse practices for information transmission, persuasion, brand image building, and reinforcing social responsibility. The reports showcase Apple's actions, achievements, and future objectives in carbon emissions reduction, water resource management, and waste handling. Data, statistics, and examples substantiate the effectiveness of Apple's environmental initiatives. The reports also emphasize Apple's environmental responsibility, dedication to sustainable development, and collaboration with supply chain partners. This enhances Apple's image as an environmentally conscious and socially responsible corporation. Partnerships with governments, NGOs, and stakeholders are highlighted to illustrate positive influences and strengthen readers' identification with Apple.

### **4 Analysis of Social Practices**

#### **4.1 Social practice of the United Nations SDGRs**

The United Nations' social practice (Chernyavskaya et al.,2021,491-506) significantly impacts sustainable development. It elevates public awareness and consciousness regarding sustainable development, resulting in a heightened focus on environmental protection, social justice, and economic equilibrium. Furthermore, it galvanizes nations to undertake sustainable development initiatives, facilitating policy formulation and implementation. This practice cultivates international cooperation and partnerships among countries and stakeholders, fostering the exchange of expertise and resources in pursuit of sustainable development objectives. In summary, the United Nations' social practice plays a constructive role in advancing sustainable development.

#### **4.2 Social practice of AEPRs**

Apple's social practice has profound semantic significance, underscoring its commitment to environmental protection, sustainable development, and corporate social

responsibility. It enhances transparency, enabling the public to comprehend Apple's environmental endeavors and accomplishments. Moreover, it catalyzes other firms, propelling the entire industry toward greater sustainability.

In summary, Apple's social practice is of paramount significance at the semantic level. It demonstrates the company's unwavering dedication to environmental protection and sustainable development while raising public awareness and recognition of its endeavors. Furthermore, it propels advancements and innovation within the industry, contributing positively to a more sustainable future.

## 5 Conclusion

This paper employs corpus and CDA methods to examine the relationship between the SDGs and corporate environmental progress reports, using the United Nations SDGRs and AEPRs spanning from 2015 to 2022 as its primary data sources. The analysis examines high-frequency verbs, nouns, modal verbs, and results from LDA topic modeling. Additionally, it delves into the discourse and social practices evident in both sets of reports. The study's findings indicate that corporate environmental progress reports frequently reference the SDGs, underscoring companies' proactive engagement with the SDGs as pivotal benchmarks for sustainable development. Furthermore, the reports employ distinct discourse strategies and semantic features that mirror each company's sustainability ethos and values, positively influencing their overall sustainability narrative.

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