

Original Paper

A Corpus-Based Analysis of Low-Carbon Image Construction in Chinese Commercial Banks

Yishan Zhang^{1*}

¹ Guangdong University of Finance, Guangdong, China

* Corresponding author

Received: July 29, 2024

Accepted: August 25, 2024

Online Published: September 12, 2024

doi:10.22158/eltls.v6n5p43

URL: <http://dx.doi.org/10.22158/eltls.v6n5p43>

Abstract

As global attention to sustainable development and environmental protection increases, corporate social responsibility (CSR) has become a crucial measure of corporate image and competitiveness. This study constructs a corpus of CSR reports from China's four major banks (ICBC, Bank of China, China Construction Bank and Agricultural Bank of China) and uses discourse analysis to explore how these banks convey low-carbon concepts through their CSR reports.

First, the study outlines the background and purpose of the CSR reports, emphasizing the banks' roles in promoting low-carbon development amidst global climate change and China's dual-carbon strategy. Discourse analysis reveals how high-frequency words, clusters and key phrases in the reports contribute to building a responsible corporate image. The language strategies in the reports highlight the banks' commitment to environmental responsibility and their efforts in promoting green finance and supporting sustainable projects, illustrating the low-carbon image they aim to construct.

Additionally, the analysis examines the different discourse strategies and attitudes of each bank, showing how they shape their low-carbon image and influence national policies and public perception. This study provides new insights into the role of China's banking sector in advancing social and environmental sustainability and offers CSR communication strategies for other enterprises.

The thesis is organized into five sections. The first section introduces the study's background, purpose, significance and structure. The second section reviews the literature on low-carbon images, image construction, corpus research and discourse analysis. The third section presents the theoretical framework, data sources and the significance of corpus linguistics. The fourth section analyzes high-frequency words, clusters and key phrases in the CSR reports of China's four major banks, focusing on low-carbon-related discourse. The fifth section concludes the study.

Keywords

Chinese Four Commercial Banks CSR reports, Corpus-based; Discourse Analysis, Image construction, low-carbon

1. Introduction

This chapter primarily addresses the introduction of the study's background, purpose and significance as well as the thesis's organizational framework.

1.1 Background and Purpose of the Study

China has committed to achieving carbon peaking by 2030 and carbon neutrality by 2060. The global economy is transitioning towards low-carbon development, following phases of industrialization and informatization. The adjustments in industrial structures and consumption patterns driven by the low-carbon economy have positioned carbon finance as a new competitive frontier in international finance (Guo, 2010).

Commercial banks, as resource allocation hubs (Guo, 2010), actively participate in the carbon finance business. The realization of this ambitious goal is the need for commercial banks to respond to the international financial competition to grasp the right to speak on carbon finance so that the market status and brand image of these commercial banks actively participating in the carbon finance business will be significantly enhanced.

A low-carbon image is crucial for a bank's corporate social responsibility. It showcases its commitment to environmental protection and sustainable development, highlighting the bank's proactive sustainability efforts and strengthening its public and market reputation.

In addition, in-depth research on low-carbon image construction not only helps to broaden the scope of research in this field but also promotes the improvement and development of banks' low-carbon discourse systems, facilitating the wide dissemination and in-depth exploration of related research. This is of high reference value for enriching the theoretical system of bank image construction and improving the influence of international low-carbon discourse, which should not be ignored.

2. Method

This thesis adopts a combined qualitative and quantitative approach. The following steps outline the analysis process:

- 1) Corpus Construction: A self-built corpus comprising CSR reports from China's three major commercial banks (2017-2022) will be utilized.
- 2) Corpus Analysis Tools: Tools such as AntConc will be employed to perform statistical analysis, ensuring objectivity and reliability.
- 3) Discourse Analysis: An in-depth examination of attitude and connotative meaning within the CSR reports will be conducted to understand the strategies and intentions behind low-carbon image construction.

The corpus-based study refers to a linguistic research method based on a corpus, which is grounded in a large collection of carefully compiled texts and also an effective approach to scrutinizing such discourses from various perspectives (Hameed, 2022). Corpus linguistics takes real language data as the object of study, analyzes a large number of language facts from a macroscopic point of view and searches for the laws of language use from them (Yang, 2002). Through probabilistic statistical methods, it concludes, providing not only statistical data and authentic language materials but also constructing new theories and verifying existing ones.

This project primarily employs the "corpus-based" research method within corpus linguistics, that is, based on the self-built corpus of the Corporate Social Responsibility (CSR) reports from China's three commercial banks (2017-2022). It utilizes corpus retrieval and analysis tools such as Antconc to statistically identify strategies and processes, thereby ensuring the objectivity, authenticity and persuasiveness of the research results.

Besides, based on the self-built small corpus, the project conducts an in-depth analysis of the application and method of discourse analysis in the CSR of three commercial banks. Through this research, we can more accurately understand the key role of discourse in image construction, reveal the intentions and attitudes behind it and thus provide a new research perspective and theoretical support for low-carbon discourse construction.

In summary, this project innovates in the selection of research subjects, the application of research methods and the expansion of research perspectives. It is expected to inject new vitality into the research field of constructing a low-carbon image for China's banking industry and promote the in-depth development of this field.

2.1 Research Questions

This study employs both quantitative and qualitative methods to investigate the low-carbon image of Chinese commercial banks. The research is designed to address the following questions:

What type of low-carbon image have Chinese commercial banks established?

How do Chinese commercial banks construct their low-carbon image?

2.2 Research Data

The corpus collected for this study originates from the CSR reports on the official websites of the four major banks from 2017 to 2022, totaling 24 reports. By filtering and cleaning the raw data (such as merging duplicate texts, removing irrelevant content and deleting images), the final text was extracted in text format. On this basis, a self-built corpus of CSR reports from the four major banks (hereinafter referred to as the CSR Corpus) was created. The corpus retrieval software used in this study is AntConc 4.2.4. Statistical analysis reveals that the total number of word tokens in this specialized corpus is 754,321 words and the total number of word types is 24,533 words.

2.3 Research Instrument

This study employs a corpus-based discourse analysis method to examine the low-carbon image constructed by China's four major commercial banks. First, the study utilizes the corpus software

AntConc 4.2.4 to retrieve the top 300 high-frequency content words and employs a word cloud visualization app to make the results more intuitive, thereby investigating the low-carbon discourse themes in the banks' CSR reports. Secondly, by observing and analyzing the collocates of the high-frequency content word "green" in the self-built corpus, the study further elucidates the characteristics of the low-carbon discourse-generated image of Chinese banks.

Subsequently, the study analyzes the discourse in the CSR reports to examine its connotative meaning in the texts the attitudes of Chinese commercial banks towards constructing a low-carbon image and explores how the banks construct this low-carbon discourse image.

3. Result

Combining corpus-based study and discourse analysis, this research finds that CSR reports of Chinese commercial banks tend to integrate financial strategy with low-carbon discourse to project a positive, environmentally conscious, policy-compliant image. The subsequent sections delve into the word list, clusters, KWIC (Key Word in Context), and discourse analysis, which more comprehensively reveal the linguistic features of the corpus and address the initial research questions: what kinds of low-carbon images have the commercial banks constructed and how these images are constructed.

3.1 Corpus Analysis in CSR Reports of Chinese four Major Banks

Frequency statistics are the most direct method provided by corpus analysis (Qian, 2016). High-frequency words are the starting point for discourse research assisted by corpora and high-frequency content words often indicate the focus of the text (Zhou, 2023), serving as an external manifestation of core issues at the lexical level. Stubbs asserts, "Analyzing repeatedly occurring phrases is crucial for studying language and ideology" (Stubbs, 1996). Therefore, this study uses the word frequency (Word List) statistics function of the corpus retrieval software AntConc to identify the top 50 high-frequency content words (see Figure 8) to uncover key topics embedded in the low-carbon discourse corpus and observe the language operation mechanisms used by CSR reports when describing the image of Chinese commercial banks.

Functional words, although they have typical collocation behaviors, mainly reflect grammatical structures and should not be the focus of research (Yang, 2002). Thus, after removing function words, the remaining open class content words are shown in the figure. "The core vocabulary includes words which occur not only frequently, but with a relatively even distribution across a wide variety of texts and text types" (Stubbs, 2005). As shown in the figure, the retrieved high-frequency words appear frequently and are widely distributed, occurring in all 24 files. Therefore, the 50 open-class words also constitute the core vocabulary in the reports.

3.1.1 The Analysis of High-Frequency Words of Linguistic Features in CSR Reports

Word frequency statistics provide the most direct method for corpus analysis (Qian, 2016). High-frequency words serve as the starting point for discourse studies assisted by corpora, as these words often indicate the focal points of the text (Zhou, 2023), representing the core issues at the lexical

level. Stubbs posits that “analyzing recurrent phrases is crucial for the study of language and ideology” (Stubbs, 1996). Therefore, this study utilizes the word frequency statistics function of the corpus analysis software AntConc to identify the top 50 high-frequency content words (see Figure 8). This approach aims to uncover key topics embedded within the low-carbon discourse corpus and observe the linguistic mechanisms employed in depicting China’s national image.

Although function words also exhibit typical collocation patterns, these patterns primarily reflect grammatical structures and should not be the focus of this study (Yang, 2002). Consequently, after removing function words, the remaining open class words are illustrated in the figure. The core vocabulary includes words that occur frequently and are evenly distributed across a wide variety of texts and text types (Stubbs, 2005). As shown, the retrieved high-frequency words appear frequently and are widely distributed, occurring across all 24 documents. Hence, the 50 open class words identified are considered core words within the reports.

Four major categories of high-frequency words:

Financial Operations: The words bank, financial, services, development, branch, finance, loans, customers, credit and business highlight banks' core focus on financial services, management, loans and customer relations. Terms like risk, control and system underscore their emphasis on managing financial risks and ensuring operational stability.

Corporate Social Responsibility and Sustainability: Terms such as corporate, responsibility, management, report, social and support indicate banks' commitment to corporate governance, social responsibility and transparent reporting. They also prioritize employee training and customer service.

Poverty Alleviation and Social Development: Terms like poverty, rural areas and alleviation demonstrate banks' efforts in poverty reduction and social development, particularly in underserved regions.

Environmental Protection and Low Carbon Development: Words such as green, environmental, carbon, energy and protection signify banks' initiatives in promoting sustainable practices, managing environmental impacts and reducing carbon footprint. They also emphasize green product development and sustainable energy practices.

Innovation and Future Development: Terms like products and innovation highlight banks' investments in developing new financial products and services. Reporting and information terms underscore their commitment to transparency and accountability through comprehensive reporting practices.

It is observed that the high-frequency words can be categorized into four main groups according to their lexical meanings, explaining the four main themes, namely finance and business operations, CSR and sustainable development, environmental protection and low-carbon development and innovation and future development, reflecting that the bank focuses on the development of its financial business while at the same time corresponding to the national call for a dual-carbon policy. The core words carbon and green are all mentioned in their CSR reports. They are evenly distributed, indicating that low carbon is the next word with the highest frequency and significant research value (Yang H.Z.,

2002).

Therefore, it can be concluded that four central commercial banks were willing to project the image of environmentally friendly, low-carbon advocates.

Table 1. The Chart of 50 high-frequency Words

High frequency Word in CSR Reports							
Type	Rank	Freq	Range	Type	Rank	Freq	Range
bank	1	8925	24	corporate	26	1459	24
financial	2	4711	24	information	27	1433	24
development	3	4066	24	responsibility	28	1422	24
management	4	3936	24	protection	29	1400	24
green	5	3614	24	training	30	1396	24
services	6	3178	24	products	31	1382	24
china	7	3101	24	banking	32	1380	24
rmb	8	2612	24	areas	33	1351	24
service	9	2608	24	rural	34	1305	24
branch	10	2593	24	loan	35	1295	24
finance	11	2401	24	customer	36	1293	24
social	12	2351	24	reporting	37	1270	24
new	13	2321	24	people	38	1266	24
employees	14	2283	24	total	39	1263	24
risk	15	2128	24	energy	40	1262	24
business	16	2099	24	environmental	41	1217	24
poverty	17	1936	24	billion	42	1206	24
credit	18	1856	24	building	43	1176	24
enterprises	19	1780	24	construction	44	1143	24
system	20	1714	24	key	45	1142	24
report	21	1700	24	control	46	1116	24
loans	22	1658	24	alleviation	47	1114	24
customers	23	1657	24	end	48	1106	24
support	24	1645	24	office	49	1094	24
million	25	1517	24	carbon	50	1093	24

3.1.2 The Corpus-based Analysis of Clusters in CSR Reports

The word cluster statistics can verify the distribution and typical features of phrases, expressions and collocations in a corpus. By extracting and analyzing words with abnormally high frequencies in

discourse, as well as words or word groups with co-occurrence relationships, the theme of the discourse can be determined (Yang, 2002). Through statistical analysis, it was found that the word "green" related to the low-carbon topic had the highest frequency and meanwhile "low-carbon" is the theme word. Therefore, this article identifies "green" and "carbon" as the central node word and this study will focus on four-word clusters. This choice is because typically, there are a large number of three-word clusters extracted from the text and due to the presence of numerous function words, three-word clusters cannot fully reflect the essence of the text (Chen, Ding, & Ding, 2013). Setting the Cluster Size to 4, Search Term Position to on Left/Right, frequency to 10, Sort by Frequency, capturing all the clusters that appeared, finally generating a word cloud to visually highlight them, enabling readers to quickly grasp the essence of the text (Yuan, 2016), as shown in Figure 9.

Corpora can compensate for the shortcomings of intuitive inference alone. Utilizing word frequency, keywords, collocation, word clusters, patterns and other information provided by corpora facilitates the analysis of discourse presentation (Qian, 2010). Optional patterns of collocation, colligation and semantic preference highlight relevant aspects of meaning and prosody can be searched for in the immediate context (Sinclair, 2004).

Below are three main themes grouped by frequency:

First group: High-frequency themes (high word frequency). From a macro perspective, banks attach great importance to the discourse construction of green development policies. "green," "low carbon," "development," and "balance" focus on green and low-carbon development, indicating that low-carbon development is a core issue in banks, emphasizing the importance of green development and the balance between development and environmental protection.

Second group: Medium-frequency themes (moderate word frequency). Medium-frequency themes reflect banks, as commercial entities, integrating green into their financial characteristics while developing the financial industry. Related clusters such as "sustainable finance of green" and "green finance inclusive finance" demonstrate the role of green development in finance, with both complementing each other. "Responsibility Report Pursuing Green" focuses on corporate social responsibility and green goals. "Green credit," as part of green finance, emphasizes that the core of financial products lies in green, expressing the bank's emphasis on the research and development of green financial products.

Third group: Low-frequency themes (low word frequency). This theme involves livelihood construction, upgrading of infrastructure, green industries and green finance reform, expressing the bank's emphasis on implementing the theme of green development in specific areas such as green infrastructure, industrial upgrading and financial reform. Considering their low frequency, however, it does exist in the report that proves the bank also pays attention to some low-carbon actions in the industry. These may be aspects that banks need to explore and implement in the process of green development.



Figure 1. Word Cloud of Clusters of Green

Shifting the attention to the term "carbon," we'll conduct a similar analysis using the established parameters. The resulting clusters, depicted in Figure 9, prominently feature associations with "green," "low carbon," "carbon peak," "carbon neutrality," "emissions," "tons," and "energy conservation." Together, these clusters encapsulate a thematic emphasis on reducing carbon emissions, enhancing energy efficiency and advancing sustainable development. This underscores the banking sector's prioritization of energy conservation and its alignment with the contemporary discourse on carbon reduction.

Upon closer examination of the Key Word in Context (KWIC) index, it becomes evident that the terms "carbon peak" and "carbon (neutrality)" are particularly concentrated within the 2021 Corporate Social Responsibility (CSR) report. Notably, 2021 marked the official introduction of China's "dual carbon" policy. This observation suggests that commercial banks in China are strategically positioning themselves at the forefront of topical issues, aligning with national policies such as the "dual carbon" strategic objectives, thereby projecting a distinct low-carbon image.

Table 2. The Chart of Clusters of “Carbon”

Cluster	Rank	Freq	Range
green and low carbon	1	87	18
carbon peak and carbon (neutrality)	2	43	4

emissions tons of carbon	3	17	2
million tons of carbon	4	13	8
energy conservation and carbon	5	12	2

Therefore, it can be generated that Chinese banks highly value green and low-carbon development.

Firstly, in the high-frequency themes, banks emphasize the importance of green development policies, considering green and low-carbon development as core issues and highlighting the balance between green development and environmental protection. Secondly, in the medium-frequency themes, banks integrate green into their financial features by promoting the development of sustainable finance and green financial products to support green development. Lastly, in the low-frequency themes, banks implement the green development theme in specific areas, including livelihood construction, infrastructure upgrading, green industries and financial reform.

These efforts demonstrate the commitment of Chinese commercial banks to construct a low-carbon image closely aligned with contemporary hot issues and national policies.

3.2 The Discourse Analysis of KWIC of Linguistic Features in CSR Reports

Every word tends to occur in clusters with other words, providing valuable insights for collocation, association and semantic resonance studies (Yang, 2002). These clusters, termed micro-contexts or "co-text" (Li & Pu, 2001), offer not just phrase and sentence-level usage contexts but also broader discourse contexts.

To gain deeper insights into how Chinese commercial banks shape their low-carbon image, the author examines index lines related to carbon in the article. Indexing functions aid in interpreting speakers' and writers' attitudes, extending to the study of semantic prosody (Qian, 2010), which spreads connotational coloring beyond single-word boundaries (Partington, 1998) and reveals significant linguistic patterns in the text (Sinclair, 1991). Researchers can tailor criteria according to their needs.

In this paper, "carbon" serves as the search word, with analysis covering attitude and connotative meaning.

Analysis reveals that verbs collocated with "carbon" primarily convey positivity, such as "advocate," "advance," and "support," indicating banks' proactive low-carbon actions and encouragement for participation. These verbs underscore the banks' leadership and responsibility in promoting low-carbon transformation. Other verbs, like "saved," "reduced," "provides," "supported," and "carry out," demonstrate concrete actions and support in low-carbon practices, enhancing the bank's credibility and environmental image. Verbs like "advanced," "develop," "facilitated," and "integrate" signify continuous improvement and development in low-carbon actions, reflecting the banks' strategic vision and perseverance. Verbs such as achieving and reaching highlight the banks' low-carbon achievements, emphasizing specific results in the transformation process. Lastly, verbs like "control", "measure", "formulate" and "underwrite" showcase compliance and standardization in low-carbon management

and financial products, reflecting regulatory operations and responsible attitudes.

In conclusion, through positive verbs and discourse prosody in CSR reports, banks portray themselves as leaders and practitioners in low-carbon transformation and green finance. By advocating concepts, providing action support, achieving goals and adhering to standards, banks convey commitment and practical contributions to environmental protection and sustainable development, enhancing trust and support.

Table 3. Part of the KWIC

Resource	KWIC	Search Word	KWIC
2017 ABC.txt	protection activities and advocated energy saving, emission reduction and low-	carbon	travel in ABC.
2017 BOC.txt	green office, saved energies and reduced emissions to advance low-	carbon	operation.
2017 CBC.txt	environmental responsibilities seriously and provides strong	carbon	economy and environmental protection industry.
2017 ICBC.txt	of environmental and social risks, and continjed to advance low-	carbon	operation in all aspects, e.g. credit policy.
2018 ABC.txt	to provide financial support for green projects such as low	carbon	and environmental protection, resource conservation and clean energy.
2018 BOC.txt	of raising the office efficiency, thereby achieving green and low-	carbon	operation.
2018 CBC.txt	priority strategy, actively promote online financial services; adhere to low-	carbon	operations, alleviate energy consumption and impact on the climate;
2018 ICBC.txt	of environmental and social risks, and continued to advance low-	carbon	operations,
2019 ABC.txt	green development and advocates a simple, moderate, green and low-	carbon	way of production and life.
2019 BOC.txt	reducing energy consumption to develop into a sustainable and low-	carbon	bank.
2019 BOC.txt	reaching 96.64% Promoting green office The Bank advocated "green and low-	carbon "	philosophy, intensified efforts to meet the requirements for green
2019 CBC.txt	communities in the new era. Facilitating the green and low-	carbon	development.
2019 ICBC.txt	prevention and control of environmental risk,and continuously promoted low-	carbon	operation.
2020 ABC.txt	privacy, and make cyber information and data safer. Facilitating low-	carbon	development .
2020 BOC.txt	control, so as to promote the transition to a low-	carbon,	climate-resilient and sustainable economy.
2020 CBC.txt	bond issuance and underwriting, were greener and we promoted low-	carbon	operation in corporate management.
2020 ICBC.txt	social risks. The Bank continuously promoted 8524.63 Strategic goal of low-	carbon	operation, and realized the simultaneous improvement of economic, 4924.74 green
2021 ABC.txt	sustainable development, contributing our share to promoting green and low-	carbon	development.
2021 BOC.txt	in the whole bank. We will integrate green and low-	carbon	concepts into every aspect of our management and business
2021 CBC.txt	ESG Bond Issuance Index". While promoting the inclusive and low-	carbon	development of society, CCB improved its own governance capability
2021 ICBC.txt	and lush mountains are invaluable assets. We practiced green, low-	carbon	and sus- tainable daily operations, and constructed a sound
2022 ABC.txt	our business operations, and fully supported the green and low-	carbon	transformation of the economy and society.
2022 BOC.txt	greenfield reverse osmosis facility. BOC actively supports green and low-	carbon	industries worldwide, leveraging its superior financial services and businesses
2022 CBC.txt	goals: Emission reduction goal The Bank will carry out low-	carbon	publicity activities every year together with World Environment Day,
2022 ICBC.txt	Bank's attaching great importance to issues such as low-	carbon	finance and green development and also an effective response

4. Discussion

The forthcoming sections will conclude the specific knowledge gained from analyzing Chinese commercial banks' CSR reports, identifying the study's constraints, and proposing directions for future research. These findings will have broader implications for promoting environmentally responsible images in the banking industry, emphasizing the study's importance in China's financial and environmental initiatives, notably the dual-carbon strategy.

4.1 Major Findings

CSR reports of Chinese commercial banks are essential for foreign readers to understand the current state of China's financial development, Chinese discourse construction and Chinese banks' images. This paper finds that corpus-based study and discourse analysis play essential roles in constructing banks with low-carbon images by analyzing relevant high-frequency words, clusters and KWIC in CSR reports.

4.2 Limitation and Direction of Further Study

At the same time, there are shortcomings in this study, as not all examples can be fully covered due to time and space limitations and there are other relevant aspects that can be studied. More details can be found in the CSR reports than in the examples provided here, allowing future researchers to read more and conduct more case studies from various angles. Furthermore, since this paper applied a quantitative method to analyze the corpus, many words that might be relevant to studying low-carbon images need to be explored. Words are occasionally employed to research specific sentences due to the large corpus volume. However, the author must select it more concisely based on scientific techniques.

4.3 Implications

The study has implications for outreach translations and suggests using corpus-based study and discourse analysis theory in bank image construction. It recommends analyzing more CSR reports regularly using these methods to improve the dissemination of the low-carbon image of Chinese commercial banks and make further progress in Chinese low-carbon finance by balancing financial development and low-carbon implementation. This will involve choosing appropriate financial strategies and keeping abreast of Chinese dual-carbon policy to establish Chinese commercial banks as the performers and advocates of low-carbon.

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