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解構ESG的社會認知框架：混合方法的研究

(Deconstructing the Socio-Cognitive Frames of ESG: A Mixed-Method Study)

洪華薇

Hua-Wei Hung

指導教授：林博文博士

Advisor：Dr. Bou-Wen Lin

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Mixed-Method Study

本論文係洪華薇君（學號：D09741005）在國立臺灣大學商學研究所完成之博士學位論文，於民國 113 年 4 月 19 日承下列考試委員審查通過及口試及格，特此證明。

口試委員：

林博文

(指導教授)

陳忠仁

劉金瑛

王良昌

陳麗芬

林俊裕

系所所長：



Deconstructing the Socio-Cognitive Frames of ESG: A Mixed-Method Study



中文摘要

本研究運用賦名分析觀點，解讀台灣的企業如何對外溝通他們的在環境保護、社會責任以及公司治理等永續議題上(environmental, social, governance, 簡稱ESG)的實踐。我們蒐集 2015 年至 2021 年 12 家台灣企業的永續報告書，進行主題建模分析，並輔以質性方法來進行解讀。研究顯示，高科技產業在 ESG 的溝通上傾向採用面向未來的框架，著重在業務創新和品牌願景。金融業的溝通植根於永續，強調商業誠信和監管合規性。製造業則較為注重當下，強調環境保護和能源效率。我們的研究也指出，產業差異在塑造組織如何理解和傳達他們的 ESG 實踐中，發揮著關鍵作用。

關鍵字：ESG、社會認知框架、賦名、時間性、主題建模

Abstract

Drawing on the framing perspective, this study investigates and de-constructs how companies in Taiwan communicate their ESG practices. Using data from ESG/sustainability reports of twelve Taiwanese companies from 2015 to 2021, we employed a mix of topic modeling and qualitative procedures to examine differences in their ESG communications. Our findings reveal that the high-tech industry adopts a future-oriented approach, with a focus on business innovation and brand vision. The financial sector's communication is rooted in the past, highlighting business integrity and regulatory compliance. Meanwhile, the manufacturing sector focuses on the present, emphasizing environmental protection and energy efficiency. Our findings suggest that sector differences play a crucial role in shaping how organizations perceive and communicate their ESG practices.

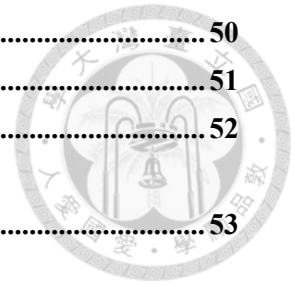
Keywords: ESG, socio-cognitive frame, framing, temporality, topic modeling

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CHAPTER ONE: INTRODUCTION



ESG, standing for Environmental, Social, and Governance, represents a set of criteria that investors consider when seeking and screening for socially responsible companies (Cort and Esty, 2020; Gillan, Koch, and Starks, 2021). These criteria create an evaluation framework for business strategies and investments by taking into account all stakeholders, such as investors, company employees, the environment, and society (Aguilera, Aragón-Correa, Marano, and Tashman, 2021; Khan, Serafeim, and Yoon, 2016). In recent years, there has been growing support for promoting ESG as a long-term initiative. Incorporating ESG is not only a method for assessing companies but also seen as an emerging factor in financial growth (Amel-Zadeh and Serafeim, 2018).

Non-financial issues such as environmental, social, and governance concerns are currently impacting the financial performance of companies and are projected to have long-term effects on their viability (Kim and Yoon, 2023). ESG reports not only depict a company's supply chain management but also outline a blueprint for its long-term sustainability strategy (Khan, Serafeim, and Yoon, 2016). Moreover, investors are beginning to consider these sustainability reports as part of their assessment before investing in company-related ventures. This makes ESG investments crucial for investors, as they have observed that companies with a focus on ESG exhibit more stable stock prices and outperform those with lower ESG rankings (Brandon, Krueger, and Schmidt, 2021). In essence, companies that prioritize ESG can expect higher returns. By prioritizing sustainability and social responsibility initiatives, companies can enhance their reputation and potentially attract a greater number of investors.

This study employs a framing perspective (Benford and Snow, 2000; Cornelissen and Werner, 2014) to explore and compare how 12 companies from Taiwan's four major industries (technology, finance, traditional, and service) – MediaTek, TSMC, Foxconn, Acer, Cathay Financial, Fubon, KGI Bank, CSC, Formosa Plastics, EVA Air, President Chain Store, Far Eastern New Century – communicate and shape their ESG strategies (Hahn, Preuss, Pinkse, & Figge, 2014). ESG as a practice of corporate social responsibility is characterized by framing processes that need to be uncovered from socio-cognitive aspects (Hahn, Preuss, Pinkse, and Figge, 2014; Matten and Moon, 2008). In terms of methodology, we utilize topic modeling to analyze the sustainability reports of these companies from 2015 to 2021, conducting individualized topic modeling analyses.

Our analysis shows that companies across different industries adopt distinctive

ESG strategies. Apart from displaying a fundamental commonality driven by international ESG guidelines, the strategies are influenced by the unique aspects of each industry. For instance, within the technology sector, MediaTek emphasizes “advanced technology,” TSMC focuses on “financial performance,” Foxconn prioritizes “occupational safety,” and Acer highlights “brand vision.” In contrast, the finance industry tends to adopt a more conservative stance, concentrating on sustainable finance. In traditional industries, perhaps due to the high pollution nature of companies like CSC and Formosa Plastics, there is a strong emphasis on issues such as raw materials, hazardous substances, and air pollution prevention and control. In the service sector, EVA Air, with customers as its primary revenue source, places a premium on flight safety, while President Chain Store, operating in the retail sector, particularly underscores product safety due to food safety concerns.

CHAPTER TWO: THEORETICAL BACKGROUND

2.1 The Rise of ESG across the Modern Business

ESG originated in a report developed by 20 financial institutions in response to a call from the United Nations Secretary-General Kofi Annan in 2004. As the acronym implies, ESG refers to how businesses and investors integrate environmental, social, and governance issues into their business models. On the other hand, corporate social responsibility (CSR) traditionally refers to activities where companies take on more social responsibility and strive to be better corporate citizens. One distinction between these two terms is that ESG explicitly includes governance, whereas CSR indirectly encompasses governance aspects related to environmental and social considerations. As a result, ESG is often a broader term than CSR (Gillan, Koch, and Starks, 2021).

Conveying CSR is becoming an increasingly vital focus for businesses (Arvidsson 2009; Ihlen 2008; Wartick & Cochran, 1985). This is due to the ongoing expectation from various stakeholders for greater disclosure of a company's CSR performance and actions than ever before (Tsai & Wu, 2022). Discourse on corporate social responsibility is seen as producing and reproducing capitalist social relations. For instance, Banerjee (2008) argues that sustainable development discourse exhibits a "domination effect," ensuring that "economic rationality" takes precedence over "ecological rationality." Golob and Podnar (2014) note that despite rhetoric and persuasion being deeply rooted in communication theory, and CSR communication serving as the basis for organizational experience transmission, the attempt to construct collective meaning and maintain legitimacy through CSR communication has not been well studied in social accounting literature. To address this gap, Hossain et al. (2019), drawing from a communicative theory perspective, explored the nature of rhetoric and rhetorical strategies embedded in sustainability reports produced by global corporations. They found that most companies engage different stakeholders or sponsors to share stories to shape and sustain a community. These globally recognized companies, with international endorsement in their business nature, actively showcase their social activities in education, charitable organizations, and technological innovations by establishing CSR management systems, adopting any global standards, and implementing CSR actions concerning social, economic, and environmental issues.

From prior research, it is evident that some companies seek favorable CSR ratings to secure reputational benefits, but limited understanding exists about how company managers navigate the "anxieties" and "enticements" brought about by CSR ratings (Espeland and Sauder, 2016; Sauder and Espeland, 2009). However, ratings not only

provoke anxieties and resistance but also hold allure (Sauder and Espeland, 2009). Previous studies indicate that management actively pursues rankings to captivate external audiences (Carlos and Lewis, 2018; Elsbach and Kramer, 1996). Responses to CSR ratings are contingent on company characteristics, such as rating performance (Carlos and Lewis, 2018; Lewis, 2018), and are influenced by moderating effects such as financial performance (Rowley et al., 2017), the trade-off between the cost of improving performance and benefits (Chatterji and Toffel, 2010), and the level of industry-specific regulation (Sharkey and Bromley, 2015). Slager and Gond (2022) found that firms began using rankings to compare themselves against peers in their group, thereby gauging how well they scored on different criteria. Good performance is also leveraged for resource access and improving managerial status. Strong corporate social responsibility performance can serve as a crucial factor in maintaining a company's position. Organizations often report their positive performance in CSR ratings to top management to sustain their resources and enhance their managerial status.

For example, Clementino and Perkins (2021) investigated how companies respond to and are impacted by ESG ratings. The research indicated that company responses to being rated can vary significantly, and these responses depend on: first, managers' perceptions of adjusting ESG ratings; second, attitudes towards excelling in ESG ratings; and third, the degree of belief in the material benefits resulting from alignment between the rating and company strategy. Martins (2022) mentioned that ratings can carry substantial strategic significance for companies, most notably influencing how key stakeholders perceive, value, and interact with these firms. Analyzing company responses thus presents an opportunity to gain a better understanding of how external assessments influence decisions and actions in the E, S, and G domains (Chrun et al., 2016).

With the increasing influence of ESG ratings, it has contributed to a broader trend of "auditing society" (Power, 1997), where accounting and financial management principles and techniques are applied to the governance of individuals and organizations (Shore and Wright, 2015). As public interest in sustainability and corporate social responsibility grows, incorporating ESG standards into investment decisions becomes increasingly important. Therefore, research related to ESG ratings primarily focuses on examining the relationship between CSR performance (measured through one or more ESG indicators) and financial performance. Rating agencies typically assess based on publicly available information, including information from mandatory non-financial disclosures such as sustainability reports, third-party research, comprehensive reports of companies, and information on company websites (Jackson et al., 2019). Investors use ESG ratings in various ways, including assessing and managing ESG-related risks

they face and engaging with invested companies. Sustainability indices are often employed to evaluate responsible company performance relative to peers and to construct responsible investment products. Slager and Gond (2022) also noted that respondents believed ESG standards could positively impact company performance, and ESG investments could lead to better risk-adjusted returns for investors. This prompts a game of input and output selection through ESG ratings, where incomplete or limited data is provided and communication or reporting is carried out regarding the choice of ratings. Additionally, respondents viewed ratings as a useful foundation to help companies scrutinize their strengths and weaknesses. Furthermore, some companies use ratings to raise senior management awareness and lobby for resources to support corporate social responsibility efforts.

Moreover, Whelan et al. (2021) found that 58% of company studies focused on operational indicators like ROE, ROA, or stock prices. They identified a positive correlation between ESG and financial performance. For investment research that typically emphasizes risk-adjusted attributes of stock portfolios (such as alpha or Sharpe ratio), 59% of studies demonstrated performance that was similar to or better than traditional investment approaches. In other words, companies with higher ESG scores tend to outperform those with lower scores. These research findings further highlight the influence of ESG on companies. Investors face challenges in assessing the reliability and quality of ESG data, which can vary based on data collection and analysis sources and methods. Environmental, social, and governance (ESG) data remains a fundamental challenge due to deficiencies in quantity, consistency, and quality (Chen et al., 2021). Given the scarcity of ESG data, people have begun relying on commercial ESG rating agencies to address the challenges associated with ESG data. However, commercial ESG ratings also exhibit various biases (Chen et al., 2021), leading to inconsistencies in ESG disclosure and measurement across industries and companies. This limitation restricts the usefulness of ESG data for investment decision-making.

Previous research has provided significant insights into ESG ratings. Using formal mathematical models, Adam and Shavit (2008) demonstrated that sustainability indices, due to their limited membership, offer insufficient incentives for most excluded companies to invest in CSR. Consistent with the empirical findings of Scalet and Kelly (2009), results indicated that the majority of firms hardly acknowledge or address the negative factors causing their exclusion from prominent CSR rankings. Gauthier and Wooldridge (2018) cited the concept of compensation strategy to explain this phenomenon. Borghesi, Houston, and Naranjo (2014) found a negative correlation between institutional ownership and a company's ESG/CSR scores. Evidence provided by Gillan, Hartzell, Koch, and Starks (2010) indicated that, within their sample period,

when companies increased their ESG scores, institutional ownership scores subsequently decreased. However, some studies suggest this relationship is nuanced. Nofsinger, Sulaeman, and Varma (2019) concluded that while institutional ownership isn't positively correlated with high environmental and social scores, it is negatively correlated with low environmental and social scores. Furthermore, research also indicates that market characteristics related to ESG/CSR activities are often based on a company's geographical location. In fact, evidence provided by Cai, Pan, and Statman (2016) as well as Liang and Renneboog (2018) suggests that national characteristics appear to be highly significant in explaining a company's ESG/CSR activities. Cai, Pan, and Statman (2017) indicated that differences between countries are more strongly correlated with national factors than company characteristics. The authors also offered evidence that economic development, legal systems, and culture play a role in these differences.

2.2 Framing Perspective

The framing perspective, applies in this study, has gained increasing attention among scholars in the fields of organization and management in recent years (Cornelissen and Werner, 2014; Snihur, Thomas, Garud, and Phillips, 2022). The framing perspective argues that issues or events themselves do not possess an objective and absolute meaning. The same object or issue, when described, defined, and interpreted from different angles, will yield different meanings and interpretations (Entman, 1993; Goffman, 1974). The "frame" concept, as introduced by Goffman (1974), refers to the "angle" from which people view and interpret things. The framing perspective has historically been employed by scholars in the field of social movements (e.g., Benford and Snow, 2000; McAdam, McCarthy, and Zald, 1996) to investigate the rise and mobilization mechanisms of social movements. In the fields of politics, social movement, and mass communication, scholars have utilized this perspective to analyze the process of public opinion formation, particularly how media or news frames influence the public's interpretation and perception of social issues (e.g., Chong and Druckman, 2007; Entman, 1993; Snow and Benford, 1992).

In the realm of organization and management, scholars have primarily extended framing research from the social movement domain. They view framing as a strategic linguistic action that actors can use to enhance their own interests, such as establishing organizational legitimacy and acquiring necessary resources for growth (Falchetti, Cattani, and Ferriani, 2022; Gurses and Ozcan, 2015). In other words, framing involves actors (such as social movement leaders, organizations, or media) constructing new cognitive and interpretive frameworks through language.

Furthermore, Kaplan's (2011) research also reveals two frames of corporate engagement in contests, shaping strategic choices and establishing dominant (collective) frames. These include framing practices of building or disrupting frames, as well as reconfiguring frames proposed by strategic actors. Within the discourse frames of strategic issues, practitioners can use key concepts, phrases, idioms, metaphors, and analogies to shape stakeholders' interpretations, making strategic proposals persuasive and justifying alternative courses of strategic action. Jeppesen and Bjerregaard (2012) also delve into the framing issues of ongoing strategy formation. In this process, investment may be required in previously novel strategies with new meanings or introducing and imbuing new frame concepts with significance, necessitating legitimizing behaviors. MacNeil and Esser (2022) also point out that over time, ESG investing has evolved from the early CSR concept, shifting the focus from the external impact of corporate activities to the influence on financial investors in their portfolio choices and the risks and returns associated with unresolved ESG issues in corporate engagement. The bridge between these two approaches is to use the sustainable frame as an overarching concept that can be mapped onto capital supply and the techniques adopted by institutional investors. In other words, ESG investing cannot escape the framing effect, as the way information is presented can influence individuals' perceptions and decisions. Given that ESG information is still evolving, considering how ESG information is presented may have significant implications for investment decisions.

Given that previous research related to ESG scores has mainly focused on the correlation between CSR and performance, such as using various ESG indicators (such as GRI, SASB guidelines) and investigating their relationship with financial performance, researchers can approach the study from a sociocognitive and linguistic strategy perspective to understand how different industries and companies plan and develop their ESG strategies and behaviors. This shift in perspective can help us address the research question in a more nuanced way, considering the role of social cognition and language strategies in shaping ESG practices and perceptions across various industries and organizations.

2.3 Optical Character Recognition (OCR) technology

In this study, we use optical character recognition (OCR) technology to help retrieve texts from the sustainability reports. OCR is a technology that converts scanned images of text into editable electronic text, enabling more efficient and accurate document management (Memon, Sami, Khan, and Uddin, 2020). It is currently rapidly advancing, with new applications constantly emerging. OCR for documents holds

immeasurable practical value. It is the science of transforming various types of documents or images into analyzable, editable, and searchable data. Over the past decade, researchers have been utilizing artificial intelligence and machine learning tools to automatically analyze handwritten and photocopied documents, converting them into electronic formats (Memon et al., 2020). This facilitates easier and more efficient data management, analysis, data entry, and file storage tasks.

Jain et al. (2021) consider Optical Character Recognition (OCR) to be a highly active research field in many challenging areas, such as pattern recognition, Natural Language Processing (NLP), computer vision, biomedical science, Machine Learning (ML), and Artificial Intelligence (AI). This computational technology extracts editable formats (such as MS Word/Excel, text files, etc.) from sources like PDF documents, scanned or handwritten texts, images (photos, advertisements, etc.) for further processing. It has found practical applications in various domains including banking, education, insurance, finance, healthcare, and keyword-based document search. Moreover, numerous OCR toolsets are available across different categories, including open-source, proprietary, and online services (Jain et al., 2021). As OCR technology continues to evolve and improve with the utilization of Artificial Intelligence techniques like deep learning, neural networks, and reinforcement learning, it learns and enhances its capabilities over time from large volumes of data. Such advancements enable the system to enhance its accuracy over time.

In the selection of methods, Rouen et al. (2022) noted that sustainability reports pose a significant challenge due to being unstructured, non-standardized, and in PDF format. Extracting text from such reports is a major challenge. To ensure accurate extraction, they employed various OCR machine learning techniques to preserve the textual content disclosed in the original documents. Given that this study also deals with a large amount of unstructured text data from multiple years of sustainability reports, manual data analysis would be difficult and time-consuming. Therefore, OCR technology is also utilized for text mining in this research.

CHAPTER THREE: METHODOLOGY

Our research methodology primarily involves the application of topic modeling (Hannigan et al., 2019; Schmiedel, Müller, and vom Brocke, 2019), supplemented by qualitative procedures (Yin, 1984) to analyze the frameworks used by Taiwanese companies in their sustainability reports and the variations in these frameworks. Topic modeling is a text mining approach that has gained increasing popularity among organizational and management scholars in recent years. It aids researchers in extracting latent topics from large volumes of text. In this study, we employ the widely used Latent Dirichlet Allocation (LDA) algorithm within the domain of topic modeling (Blei, 2012; Blei, Ng, and Jordan, 2003). LDA is an unsupervised probabilistic language model (Blei et al., 2003; DiMaggio, Nag, and Blei, 2013) that uses the statistical probability of co-occurrence of words in the text to group frequently appearing words into the same topic. This process enables the modeling of all latent topics within the text and the probability distribution of each topic within the documents.

The underlying assumptions and principles of LDA topic modeling align with traditional methods used for framework analysis, as they both involve analyzing the content of texts and deducing topics through word co-occurrences (Cornelissen and Werner, 2014). Therefore, the “topics” derived through topic modeling are conceptually and meaningfully equivalent to the central ideas and frameworks within the text (Bail, 2014; DiMaggio et al., 2013; Mohr and Bogdanov, 2013). As a result, in recent years, topic modeling has been widely applied to analyze named frameworks and their temporal variations (Fligstein, Stuart Brundage, and Schultz, 2017; Giorgi and Weber, 2015).

3.1 Research Setting

This study employs a design of case comparison (Eisenhardt, 1989). The research focuses on investigating 12 companies across four major industries in Taiwan: the technology industry, financial industry, traditional industries, and the service industry. This selection of cases is intended to provide representative coverage.

According to the statistical data from Taiwan’s Directorate-General of Budget, Accounting and Statistics in 2021, the service industry contributes the highest proportion to Taiwan’s GDP, accounting for 58.24%. Therefore, this study includes the service and financial industries in the analysis. In recent years, the domestic manufacturing industry has been increasing its contribution to GDP, and it bears a significant ESG burden. Thus, this research narrows its focus to both traditional and

high-tech sectors within the manufacturing industry. Additionally, due to the high emphasis on innovation and growth in the high-tech industry, juxtaposed with the societal pressures emphasized by ESG considerations, aligning growth strategies with societal expectations presents a substantial challenge for this sector. Our choice of the four high tech companies, for example, represent different stages in the industry chain. MediaTek is involved in IC design, occupying the upstream position in the industry chain. Foxconn and TSMC operate in the manufacturing segment. Each of these companies represents a distinct archetype. Foxconn emphasizes cost-effectiveness, while TSMC focuses on innovative technology growth and breakthroughs. Acer operates at the consumer end of the industry chain as a brand, being closest to the end consumers. This diversified selection allows the study to cover various stages of the high-tech industry chain, providing insights into different strategies and approaches to sustainability frameworks across the chain.

3.2 Data Collection

The data collection for this study is mainly divided into primary and secondary data collection. Primary data collection primarily stems from the two sources. The first source includes formal nine interviews with businesses from various fields, including AUO, E.Sun Bank, Wistron NeWeb, WeAre Strategic Consultants, TSMC (Taiwan Semiconductor Manufacturing Company), ASML, Chipbond, and Delta. The second source includes opportunistic field conversations across various companies. These processes aim to gather a diverse and extensive range of viewpoints, enhancing the comprehensiveness and realism of the study's analytical arguments.

The selection criteria for collecting secondary data in this study are as follows: First, a search was conducted for publicly listed companies announced by the Financial Supervisory Commission Securities and Futures Bureau (referred to as FSC SFB), totaling 1,423 companies. Next, from the listed companies, those belonging to the food, chemical, financial insurance, and capital industries, with a capital of over 2 billion NT dollars, were selected based on the requirement set by the Taiwan Stock Exchange (referred to as TWSE) to mandatorily produce a sustainability report (formerly known as Corporate Social Responsibility or CSR report). This resulted in a total of 431 companies. Among these, 264 companies that consistently issued sustainability reports in Chinese from 2015 to 2021 were identified. Further screening led to 54 companies that issued sustainability reports in both Chinese and English for the years 2015 to 2021. These 54 companies' sustainability reports were used as the analytical sample for this study.

Given the extensive amount of data collected, this study ultimately selected the following companies for LDA topic modeling analysis: MediaTek, TSMC, Foxconn, and Acer from the technology industry; Formosa Plastics, CSC Steel, and Far Eastern New Century from the traditional industry; Fubon Financial, Cathay Financial, and KGI Bank from the financial insurance industry; and EVA Air and President Chain Store from the service industry. This selection aims to obtain a more contextualized understanding of the knowledge, further analyze and label the topics, and combine subjective and objective knowledge to comprehend various dimensions and similarities/differences in the development of different technology industries.

3.3 Data Analysis

This study adopts a topic modeling approach to analyze the English versions of sustainability reports from 12 companies. The reports are well representatives of company practices in strategy and communication (Barkemeyer, Comyns, Figge, & Napolitano, 2014; Davidson, Dey, & Smith, 2019; Fiol, 1995). Based on the results of topic modeling, an inductive analysis is subsequently conducted (Gioia, Corley, and Hamilton, 2013). We followed the recommendations put forth by Hannigan et al. (2019) and Schmiedel et al. (2019), and divided the topic modeling analysis of this study into the following three stages: The first stage involves data preprocessing, including Optical Character Recognition (OCR), tokenization, and the removal of stop words. Second, we identify topics through the LDA (Latent Dirichlet Allocation) algorithm.

3.4 Data Pre-Processing

Due to the diverse presentation formats of sustainability reports, which often include tables and rich content in images, the conventional approach of converting PDF files to TXT format for extracting text completely falls short. Therefore, in this study, we initially employ Optical Character Recognition (OCR) to convert textual content into image files. Once the text is extracted, the program compares it with the text in the image stored in the database. This is achieved by analyzing stroke edges, discontinuous lines between text characters, and the background to recognize the text within the images (Holley, 2009). Additionally, a common algorithm in OCR is the Line Finding Algorithm, which can identify skewed pages, filter out noise spots, and infer damaged parts of characters (Smith, 2007). Finally, this process aggregates the recognized text into relatively comprehensive text files, enabling computers to effectively read this unstructured data. This facilitates subsequent data analysis and topic modeling (Grimmer, Roberts, and Stewart, 2022; Kobayashi, Mol, Berkers, Kismihók, and Den Hartog, 2018).

After successfully excerpting the text, the next step is to proceed with tokenization. This study employs the NLTK (Natural Language Toolkit) tokenization package from Natural Language Processing (NLP) to tokenize and segment English sentences. Tokenization involves marking the boundaries of the text, specifically, establishing clear boundaries between retrieval terms and sentences. This includes both word tokenization and sentence tokenization, breaking a sentence into individual words (Ahmadi, 2020). Simultaneously, we refer to a stop word dictionary, removing less meaningful punctuation marks and words from the text, such as “I”, “me”, “my”, “myself”, “we”, “our”, “ours”, “ourselves”, “you”, “you’re”, “you’ve”, “you’ll”, “you’d”, “your”, “yours”, “yourself”, “yourselves”, etc. These words are deleted from sentences as they are not as significant within the context. This elimination improves the overall performance of the system (Sharma et al., 2022). By ignoring unimportant words and extracting valuable information, the subsequent analysis for topic modeling can yield more precise insights from the content (Blei et al., 2003; Hickman, Thapa, Tay, Cao, and Srinivasan, 2022).

Furthermore, Kissos and Dershowitz (2016) also pointed out that the use of Optical Character Recognition (OCR) can lead to recognition errors (OCR Errors) due to issues with image resolution, font size, spacing, and other factors. Consequently, employing OCR introduces a variety of error distributions, including problems arising from poor image quality or the mixture of text with graphics. These issues can result in the failure to detect text within images during the text detection process, difficulties in correctly aligning and spacing different texts, and challenges in accurately binding tokens. During the course of our research, we also discovered that these aforementioned problems are particularly prevalent when dealing with sustainability reports that incorporate a significant number of tables and images.

Hence, Kissos and Dershowitz (2016) also proposed an error correction methodology that involves techniques like correction candidates generation and feature extraction for each word in the vector. However, due to the presence of specific proprietary terms in sustainability reports that might not be present in the correction dictionary, consideration must be given to out-of-vocabulary words (Kissos and Dershowitz, 2016). Consequently, to enhance the quality of output results, this study did not adopt the aforementioned correction techniques. Instead, the incorrect words were manually corrected to their appropriate forms based on human judgment.

3.5 Identifying Topics through LDA

This study utilized the Gensim module in Python to perform LDA (Latent Dirichlet

Allocation) topic modeling analysis. After transforming the preprocessed textual data into a format readable by Python, the analysis of the topic modeling was conducted. The determination of the number of topics for our model was based on the following considerations: (1) Topic Coherence Score (Stevens, Kegelmeyer, Andrzejewski, and Buttler, 2012); (2) Interactive visualization of topics using the pyLDAvis package in Python (Sievert & Shirley, 2014); (3) Human interpretability (Blei & Lafferty, 2009; Chang, Boyd-Graber, Gerrish, Wang, & Blei, 2009; Grimmer & Stewart, 2013).

Taking MediaTek as an example, we initially computed and compared the topic coherence scores of topic models with 2 to 10 topics. As shown in Figure 1, we determined a topic model with 6 topics that exhibited higher coherence scores, indicating greater consistency and convergence in the meanings represented by the words within each topic (Hannigan et al., 2019; Mimno, Wallach, Talley, Leenders, and McCallum, 2011). We employed the pyLDAvis package (Sievert & Shirley, 2014) for visualization and validation of our topic model. Furthermore, we enhanced the interpretability of the topics through supplementary exploration of the report's content.

CHAPTER FOUR: FINDINGS

After analyzing the divergences and commonalities in the development aspects of each topic, we discovered that every company in their sustainability reports addresses the three dimensions of E (Environmental), S (Social), and G (Governance). These dimensions align with the global standards for sustainability reporting introduced by the Global Reporting Initiative (GRI). The GRI Standards provide organizations with a simple common language to report non-financial information, aiding decision-making and contributing to the United Nations Sustainable Development Goals (SDGs). Considering the current complexity of sustainability report content, which encompasses a wide range of information communicated to stakeholders, the Sustainability Accounting Standards Board (SASB) has developed dedicated sustainability disclosure frameworks, known as the “SASB Standards,” for companies to follow. These standards offer investors comparable data to facilitate subsequent analysis and investment decisions. We observed that all 12 companies in the study adhere to these two sets of standards in crafting comprehensive disclosure frameworks within their sustainability reports.

The following presents the divergent points of emphasis identified among companies in four distinct industries, as derived from word analysis using the topic model. This information is provided for reference across various sectors.

4.1 MediaTek’s Topics

From the selected key terms within the topics, it is evident that MediaTek frequently employs terms related to “technology” and “stakeholders” to highlight its competitiveness within the industry.

Regarding the technological aspect, the company consistently mentions core technologies such as “CorePilot,” “headphone,” and “cell phone,” among other key terms:

“MediaTek continued its participation in the 2017 Mobile World Congress (MWC) held in Barcelona, Spain. In addition to showcasing features such as CorePilot 4.0, dual-camera systems, and enhanced energy-efficient performance in the new Helio X30 smartphone, MediaTek also presented our achievements in 5G technology development: (1) 28GHz 5G millimeter-wave hierarchical beamforming, and (2) 5G Smart Link, highlighting our contributions to the advancement of 5G technology.”

We have discovered that MediaTek, driven by its aspiration to become a technological frontrunner, aims to use innovative technologies to enhance the quality of life for all individuals. As a result, the company must continually refine and focus on

research and development in the field of technology. Being an IC design company situated at the top of the semiconductor industry chain, it's crucial to stay aligned with external developments to gain deeper insights into user needs and industry shifts. For instance, the company frequently emphasizes how its product technologies lead the global market. Examples include the next-generation flagship 5G system-on-chip - Dimensity 9000, and the world's first 7-nanometer 8K resolution smart TV SoC - Pentonic 2000, among others.

Simultaneously, the company has initiated awards such as the "R&D Excellence Award" and the "Special Contribution Award" to encourage and foster an internal culture of innovation. In the pursuit of maintaining its technological leadership, talent cultivation has become even more crucial. As a result, there is a proactive encouragement for employees to engage in external exchanges, and continuous participation in international-level technology forums and conferences. The company's research efforts are also at the forefront, consistently engaging in international conferences like the International Solid-State Circuits Conference (ISSCC) and presenting papers. MediaTek stands out as the only Taiwanese company with papers selected for 19 consecutive years, showcasing a remarkable record. Moreover, it ranks first in patent applications both domestically and internationally within the Taiwanese IC design industry, enabling MediaTek to lead in various technological domains.

Within the stakeholder topic, the company emphasizes terms such as "stakeholders," "performance," "training," and "management." These elements are integral to achieving talent attraction, retention, and cultivation, which in turn facilitate product innovation to realize the company's vision. For example:

"In order to identify suitable experts in the workplace, the company must provide ample training and guidance to newcomers, while also cultivating a friendly and inclusive work environment that fosters innovation. This environment enables employees to leverage their expertise and potential, contributing to significant growth in collaboration with the company."

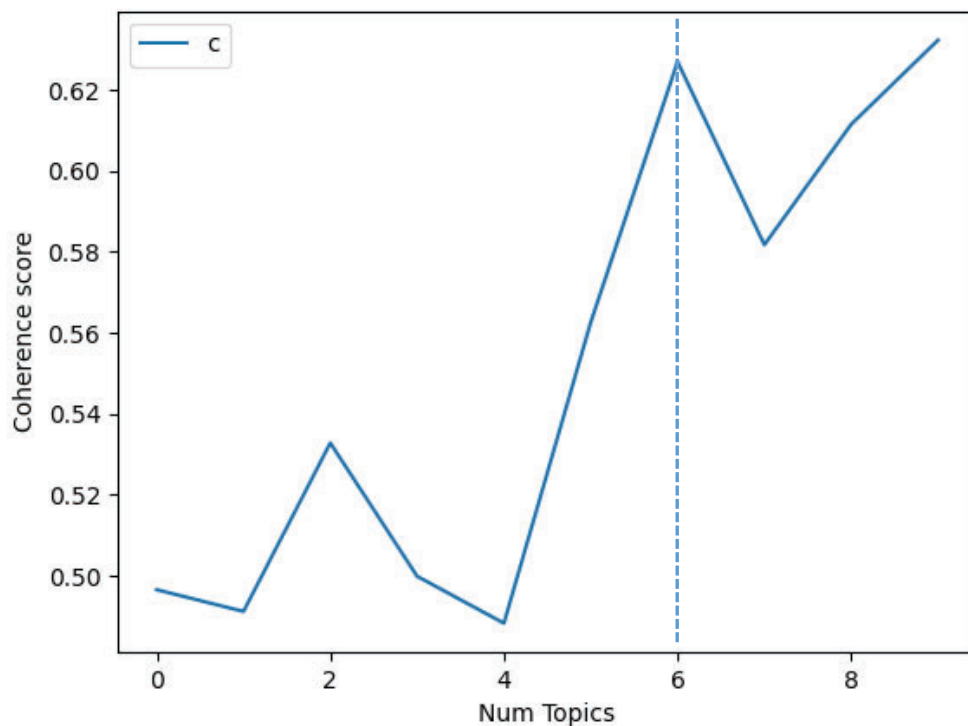


Figure 1 Coherence score under different topics for MediaTek

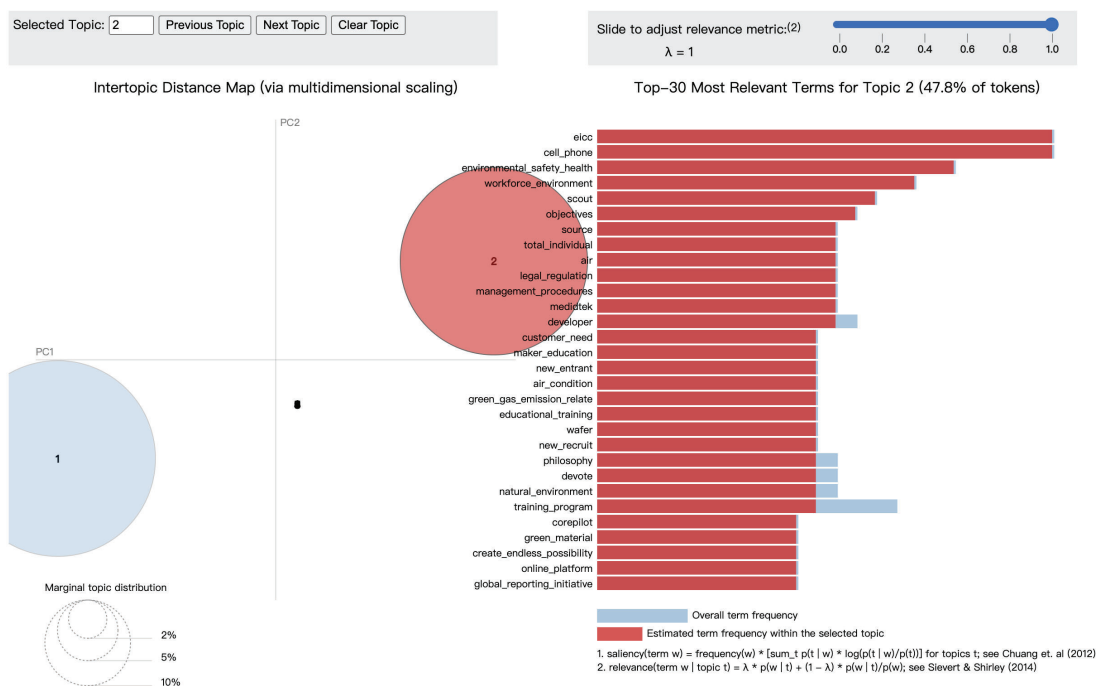


Figure 2 Visualization results using pyLDAvis for MediaTek

4.2 TSMC's Topics

From the selected key terms within the topics, it is evident that TSMC (Taiwan Semiconductor Manufacturing Company) frequently employs terms related to “responsible procurement and innovation” and “financial performance” to highlight the company's values.

In terms of “responsible procurement,” TSMC consistently mentions phrases like “a responsible purchaser” and “green manufacturing,” demonstrating their commitment to establishing a world-class semiconductor green supply chain. For example:

“TSMC is dedicated to sustainable management and responsible procurement. We require our suppliers to make advancements in areas such as technology, quality, delivery, environmental protection, human rights, safety, and health. We also factor in climate risks and actively work to enhance climate resilience, aiming to develop a low-carbon and sustainable semiconductor supply chain.”

In the realm of “innovation,” TSMC positions itself as an “innovation pioneer” within the industry:

“TSMC focuses on its core business as a specialized pure-play wafer foundry and service provider. Continuously expanding its research and development efforts, TSMC paves the way for global technological advancement through innovation. As a leader in the global semiconductor industry, TSMC is committed to manufacturing high-quality, energy-efficient, and sustainable products, assisting our clients in achieving product innovation and success.”

We observe that TSMC is acutely aware of its position as the world's largest dedicated semiconductor foundry service provider. To consistently maintain its technological leadership, the company recognizes the imperative to actively exert its influence as an industry leader within the supply chain. In its interactions with upstream and downstream partners, TSMC continually strives to enhance its capabilities across various aspects, including technology, quality, delivery, environmental protection, human rights, safety, and health.

TSMC employs a strategy of optimizing local supply chains, dedicated to enhancing the core capabilities of local suppliers to safeguard the rights of grassroots workers and promote local procurement. It is evident that TSMC mandates its suppliers to adhere to both the “Code of Conduct for Industry Ethics” and the “Supplier Code of Conduct” to ensure that suppliers clearly understand the company's specific requirements for a responsible supply chain. Suppliers also undergo regular risk assessments and audits as per TSMC's standards. For instance, to enhance the measurement technology and quality of advanced processes and expand production capacity, TSMC has organized forums focused on advanced process materials. The company is actively engaged in guiding suppliers to invest in production capacity and

improve advanced measurement technology, further elevating manufacturing quality.

We also found that TSMC, in addition to enhancing the core capabilities of local suppliers, continues to drive the upgrading of the local supply chain. For example, the company's main production base is located in Taiwan, primarily involving centralized procurement of equipment, components, raw materials, and related products. Within the scope of supply chain management, TSMC actively assists key equipment, spare parts, and raw material suppliers in improving their technology and quality, thereby increasing local procurement volume. A local supply chain not only enhances overall supply flexibility and reduces unnecessary costs in the production process, but also has the potential to lower the carbon emissions generated by a series of supply chain activities, ensuring the quality and overall efficiency of subsequent customer services.

Unlike other tech industries that focus on corporate governance, TSMC, due to its high level of foreign ownership, places a deeper emphasis on "financial performance." We can discern topics such as the "economic dimension," "performance," "stakeholder engagement," and "business practices" from the content of the report.

"TSMC believes that prudent business planning, disciplined capital management, and strong financial performance contribute to creating long-term economic value, establishing a robust financial foundation, and subsequently benefiting all stakeholders, including shareholders/investors, employees, customers, suppliers, governments, society, and others. Therefore, strong financial performance is crucial for the sustainable development of the company."

TSMC's core value proposition is that the foundation for sustainable business operations is built upon a solid financial base. The company believes that only through sound operational plans, comprehensive capital management, and strong financial performance can it create long-term, stable economic value for the company. This, in turn, provides the opportunity to continuously give back to relevant stakeholders in the future, including shareholders and investors, employees, customers, suppliers, governments, and society.

Furthermore, we also observe that TSMC's long-term investment value is based on sustained technological leadership as an innovation pioneer, excellent manufacturing services through green manufacturing practices, the pursuit of revenue growth and expanded market share, as well as enhancing profitability and investment returns. By delivering robust financial performance to shareholders and other stakeholders, the company solidifies its foundation for sustainable operations.

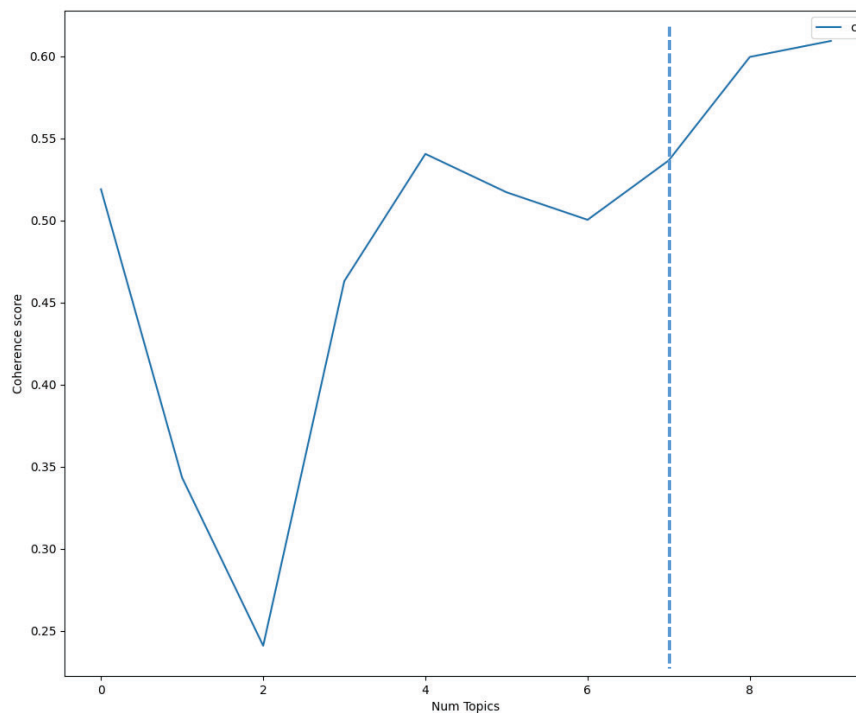


Figure 3 Coherence score under different topics for TSMC

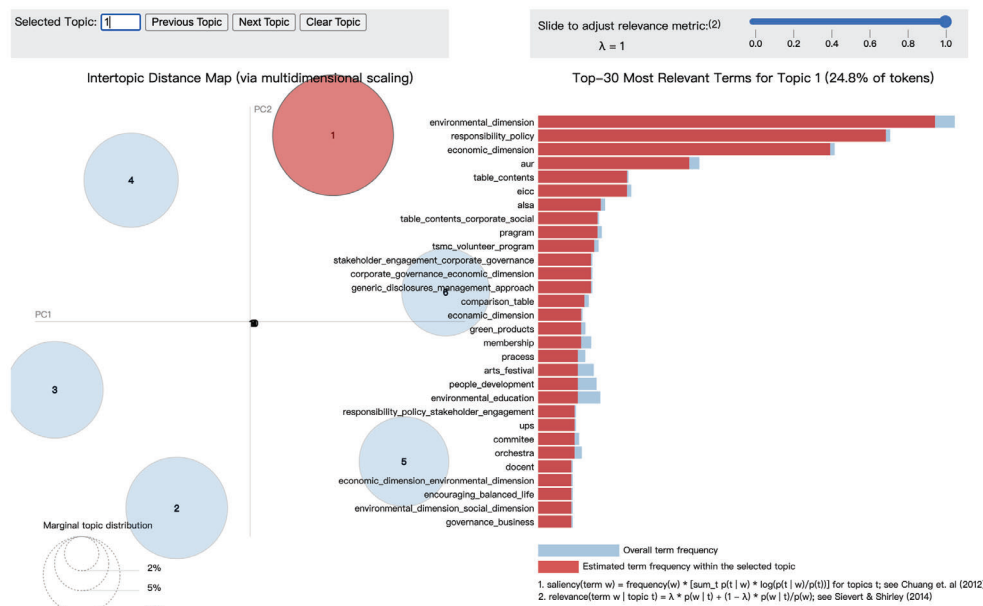


Figure 4 Visualization results using pyLDAvis for TSMC

4.3 Foxconn's Topics

From the selected thematic keywords, it is evident that the Foxconn Group has most frequently utilized terms related to “occupational health and safety” and the “Evergreen Foundation” to highlight the values the company prioritizes.

Diverging from the commonly mentioned “talent attraction and retention” in workplace and societal matters, Foxconn focuses its attention on the aspects of “employees’ occupational health and safety.” Terms such as “labor management,” “corporate employees health,” and “safety management participation” are used:

“The Group dedicates substantial effort to managing the health and safety of its employees. Beyond adhering to legal regulations, the Group pursues a goal of zero accidents, zero injuries, and zero occupational illnesses through the principles of ‘risk assessment, universal participation, continuous improvement, and zero harm.’ This is aimed at establishing a safe and healthy working environment.”

In the aspect of “production” related to occupational health and safety, terms such as “production safety” and “chemicals” are used:

“We have also established production safety management teams in all operational zones, holding weekly production safety meetings to discuss and analyze the production safety status across all zones and subsequently implement all production safety tasks.”

“We’ve established a management system for chemicals and hazardous substances to assess and monitor the usage of chemicals, ensuring that these substances do not pose harm to the environment or humans.”

The company has specifically formulated policies and commitments to ensure that employees enjoy a safe working environment in the aspects of health and safety management. The company has established a policy based on the principles of “risk assessment, universal participation, continuous improvement, and zero harm.” In addition to complying with relevant legal regulations, the company is dedicated to achieving an operational environment with zero injuries, zero occupational illnesses, and zero accidents.

For instance, in pursuit of the goal of zero accidents, the company proactively addresses potential safety hazards in its operational processes. To achieve this, the company has developed the “Group Production Safety Incident Management System” to regulate the responsibilities for reporting and investigating incidents, as well as the subsequent handling processes and accountability. To minimize risks and eliminate hazards, the company has implemented a series of improvement actions. These include rigorous adherence to equipment maintenance and related operational protocols, ensuring the completeness of equipment and facilities. Additionally, the company

provides safety education and training for relevant professionals to prevent accidents from occurring.

Our speculation regarding the company's emphasis on occupational health and safety is largely rooted in events that transpired within the Foxconn Group's subsidiary, the Foxconn Group Park, in China, back in 2010. A series of suicide incidents took place within the facility, prompting the need for the company to address the tarnished image of being associated with sweatshop practices. In response, they established hazard identification and risk assessment measures in their reports, categorizing and addressing the identified safety risks.

Furthermore, we also observe topics related to the "Evergreen Foundation," evident through keywords such as "Yonglin Foundation," "National Taiwan University," and "cancer research":

"The Yonglin Foundation has entered into a memorandum of understanding with the National Taiwan University Cancer Center, expediting international collaboration in cancer research."

The Foxconn Group integrates its resources to invest in various health promotion initiatives. For instance, the group has established the National Taiwan University Cancer Center Hospital, enriching and completing bone marrow transplant cases for the National Taiwan University Hospital. Additionally, by collaborating with relevant medical units, the group analyzes the genetic makeup of the Chinese population, with a focus on addressing threats related to cancer and aging. In recent years, there has been a proactive push for cross-disciplinary collaboration between academia and industry, aiding domestic academic research units in achieving continuous breakthroughs.

These efforts also align with the core values of promoting health, and the foundation's commitment is evident in actively promoting the concept of preventive healthcare to the general public. The Foxconn Group's initiatives not only contribute to advancements in academic research within the country but also propagate the notion of preventive medicine to the wider society.

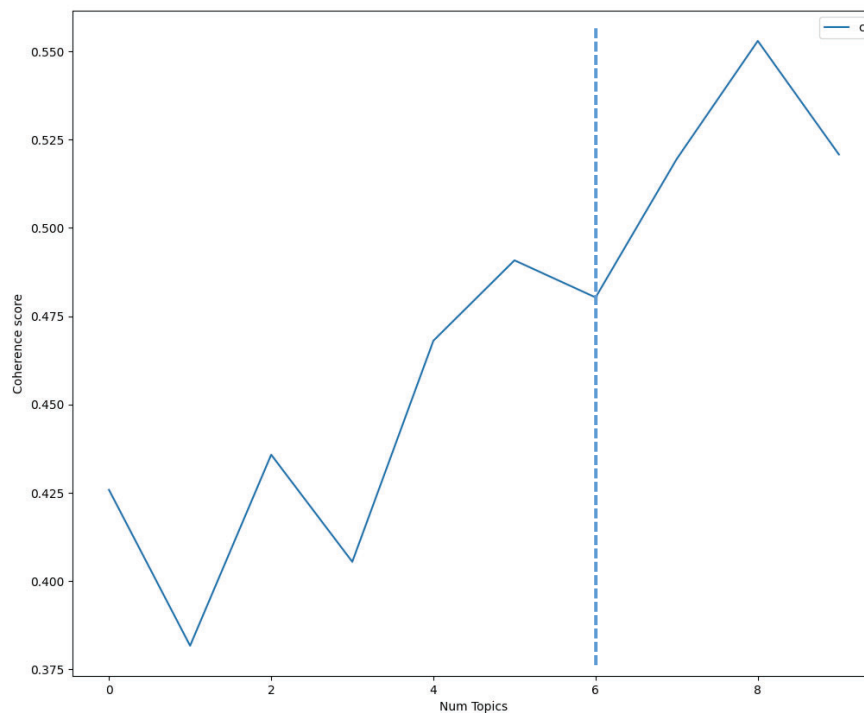


Figure 5 Coherence score under different topics for Foxconn

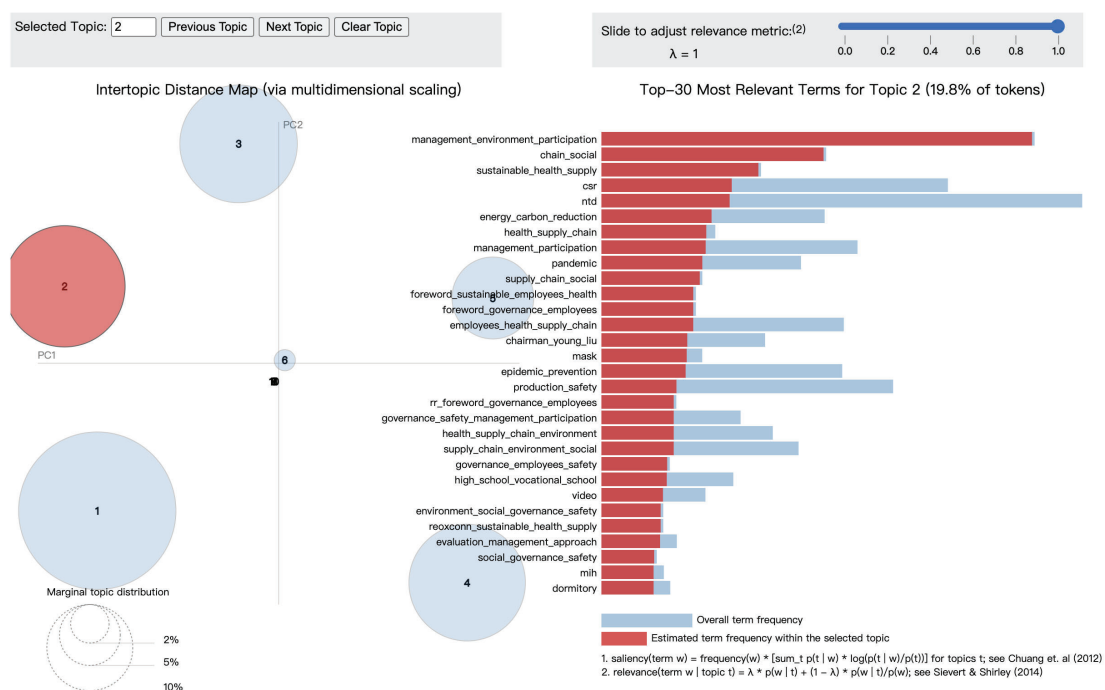


Figure 6 Visualization results using pyLDAvis for Foxconn

4.4 Acer's Topics

From the selected thematic keywords, it's evident that Acer Inc. frequently employs terms related to “brand vision” and “innovative research and product responsibility” to highlight the company's brand values.

In the aspect of “brand vision,” terms such as “chairman message,” “mission protect,” “goals achievements,” and “expanding blueprints” are used:

“Words from the Chairman and CEO: Acer continues to evolve in response to changes in the industry and lifestyle, which we believe is key to long-term business growth and sustainability. Climate change is a fundamental issue across all industries, more important now than ever before. In 2021, we announced our mission to address environmental challenges through the Acer ‘Earthion’ platform, harnessing the collective power of our employees and supply chain partners to effectively expand the societal impact of sustainable development efforts.”

We've observed that the Acer Group is committed to conveying its product and service values, as well as its vision and goals, to various stakeholders through a variety of channels. These stakeholders include employees, customers, investors, suppliers, government agencies, advocacy organizations, non-profits/community groups, industry associations, research institutions, and the media. The group utilizes diverse social media platforms to introduce new products and engage in a range of promotional marketing activities. This proactive approach enables the group to interact with both existing and new target audiences, enhancing the experiential value of the brand for its customers.

Upon delving into the Acer Group's commitment to developing its own brand and its underlying causes and consequences, we can trace back to the “smile curve” theory advocated by the founder of the group, Stan Shih, in 1992. According to Stan Shih and Lin Wen-ling (2004) in their book “Strategic Transformation: Acer Incorporated,” the smile curve can be divided into three segments: the left, middle, and right. The left segment encompasses technology and patents, such as research and design of intellectual property. The middle segment pertains to assembly and manufacturing, while the right segment involves branding and services. The curve represents added value, with the highest added value found at the positions corresponding to the left and right segments, and the lowest in the middle segment. Connecting these segments creates a smile-like symbol.

Founder Stan Shih believed that Taiwan's industry should actively move towards the two ends of the curve. Only by combining cutting-edge technology and patents at the forefront with branding and services at the end can high added value be maintained, thereby enhancing overall industry competitiveness. The evidence has shown that the

smile curve theory not only influenced Acer's brand development but also guided Taiwan's industry to gain more exposure internationally. As a result, self-owned brands gradually gained global recognition.

Research has also found that companies with a brand vision statement grow at a rate four times faster than typical companies (Zook and Allen, 2003). According to IDC's (2021) latest survey report on global PC shipments in 2021, Acer Group ranks among the top five computer brands globally with a market share of 6.9% in the personal computer market – a strong testament to their success.

The Acer Group also places a strong focus on the aspect of “innovative research and development,” as evidenced by terms such as “responsible innovation,” “innovation service,” and “cultivating technology”:

“Innovation and services respond to societal and environmental needs. Acer's innovative products help people address challenges in real-time, while through product design and manufacturing, we also achieve sustainable goals to reduce environmental impact. Acer continues to develop a wide range of software and hardware application technologies and products, covering areas such as smart healthcare, smart cities, and circular innovation.”

Continuous innovation is Acer's core value, as the group believes that it's through this principle that they gain competitive advantage. For example, Acer invests significant resources into its patent strategy. They not only employ various incentive measures to encourage employees to engage in invention and creation but have also developed the ePatent electronic patent management system. This system not only processes patent applications but also enables the tracking of patent case information and status. Furthermore, Acer has established the eBook electronic management system for research and development logs, replacing traditional paper-based logs. Through this system, researchers can create their own development logs, facilitating subsequent management and preservation. This commitment to innovation and the implementation of digital tools showcases Acer's dedication to staying at the forefront of technological advancement.

Not only in patents but also in various projects such as smart healthcare, smart cities, and cloud services, Acer is actively engaged. In the field of smart healthcare, Acer has developed AI-assisted diagnostic software for ophthalmology. Through edge computing, the software performs screening and interpretation without requiring an internet connection. This significantly reduces patient testing time, bridges the gap between doctors and patients, and achieves preventive healthcare effects. In terms of their own products, Acer is invested in circular innovation, aiming for more sustainable development in both consumption and production processes. For instance, Acer

introduced the first environmentally friendly laptop. The laptop's casing and keycaps are made from post-consumer recycled plastic (PCR), and the packaging is made from 100% recyclable materials. This initiative significantly reduces plastic usage. The laptop also features a stand, showcasing Acer's commitment to sustainability. This eco-friendly approach was even recognized with the 2021 Red Dot Packaging Design Award in Germany.

The following are the differences highlighted through word analysis using topic modeling among three Taiwanese financial holding companies. We discovered that the presentation of the financial industry in sustainability reports is more consistent, whereas the technology industry actively emphasizes company characteristics and values in their reports. This significantly reveals the unique focuses of each technology company. Apart from the three dimensions of ESG in the reports, the financial industry often features special topics such as “digital finance” or “sustainable finance.”

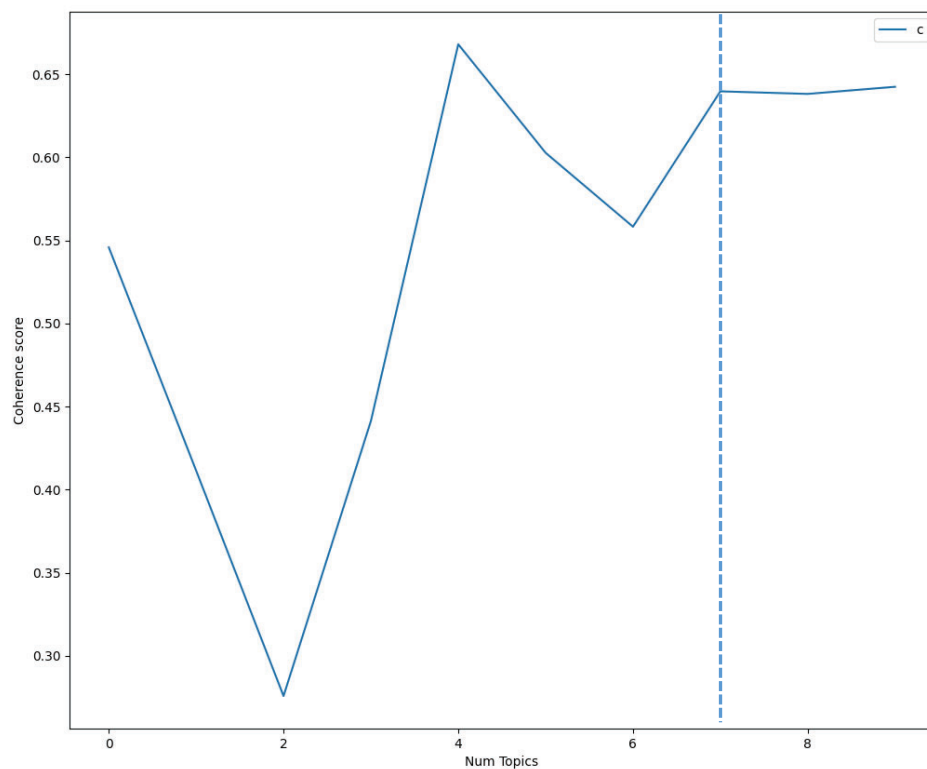


Figure 7 Coherence score under different topics for Acer

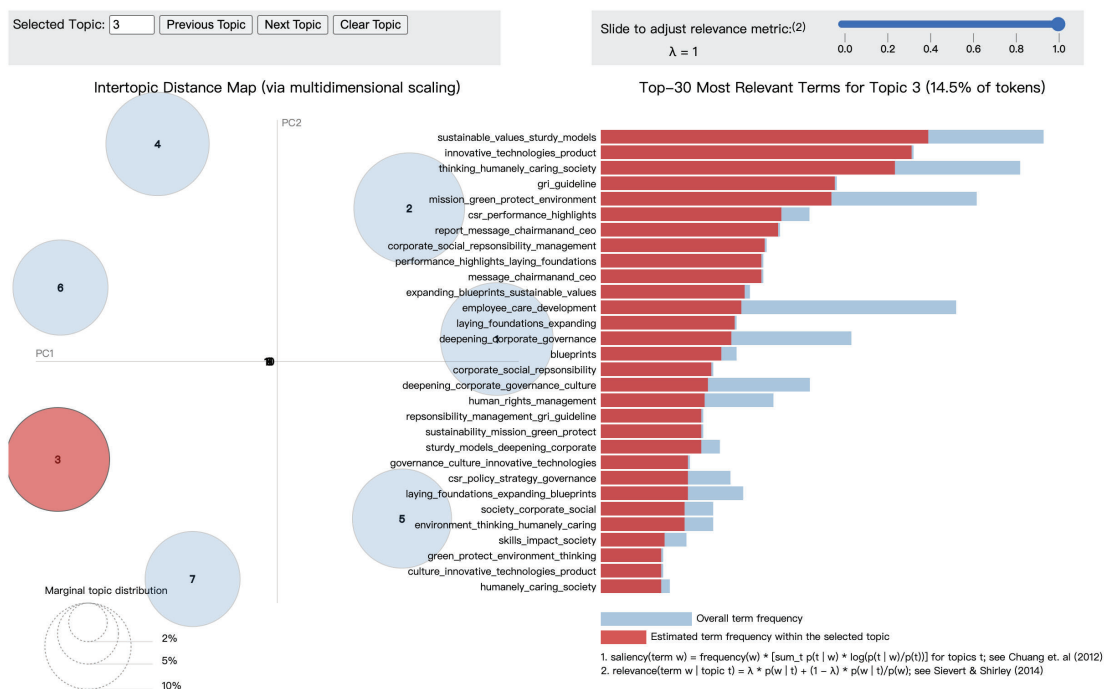


Figure 8 Visualization results using pyLDAvis for Acer

4.5 Cathay Financial Holdings' Topics

From the thematic terms, we can discern that Cathay Financial Holdings emphasizes “sustainable finance” in its financial aspect. Upon delving into the content of the sustainability report, we can further categorize this into various subtopics, such as “responsible investment and credit,” “responsible banking,” and “sustainable insurance”:

“Cathay believes that pursuing corporate sustainability contributes to promoting social stability, leading to a positive societal cycle and enhancing the company’s long-term value. Therefore, we incorporate sustainable development into Cathay’s core competencies, adhere to international sustainable development frameworks, and drive sustainable finance.”

For instance, if a company can integrate ESG considerations into its traditional investment and credit processes, it can enhance long-term benefits. By incorporating ESG into company decision-making and conducting daily operations with list screening, followed by ESG-focused management of investment and loans, the company can further amplify its industry influence. Additionally, concerning the United Nations’ “Principles for Responsible Banking (PRB),” Cathay was the first voluntary adherent bank in Taiwan. It not only established loan targets for renewable energy but also ceased financing new coal-fired power projects in 2019. In the insurance sector, Cathay was proactive in declaring its commitment to the “Principles for Sustainable Insurance (PSI)” to factor ESG risks into consideration. It collaborates with insurance regulatory bodies and the government to promote ESG collectively.

“Cathay believes that responsible investments and loans must incorporate ESG into existing procedures to safeguard long-term interests. Therefore, we implement exclusion screening and, more importantly, integrate ESG factors into comprehensive investment decisions in day-to-day operations. We also manage investments and loans based on risk levels and actively implement post-investment/loan management after ESG-focused investments/loans to better address ESG risks. Cathay also practices thematic investments/loans and impact investments to maximize financial influence and drive sustainable development. Apart from our own assets, we encompass authorized assets within the scope of responsible investment management.”

In the realm of responsible investment and credit, Cathay Financial Holdings integrates ESG into investment and credit decisions by establishing relevant ESG investment standards and screening mechanisms. This ensures that the companies the firm invests in can align with sustainable development goals. In the domain of responsible banking, apart from being the first voluntary adherent bank to the Principles for Responsible Banking (PRB) in the country, Cathay Financial Holdings’ policies and actions toward promoting sustainable development also align with United Nations’ Sustainable Development Goal (SDG) 13, “Take urgent action to combat climate change and its impacts,” and SDG 17, “Partnerships for the Goals,” which emphasizes strengthening global cooperation and diverse partnerships to drive sustainable

development. In the context of sustainable insurance, the concept and principles of sustainability are incorporated into the insurance business. This ensures that the insurance products offered not only adhere to ESG standards but also promote ESG ideals through the planning of relevant activities.

Furthermore, Cathay Financial Holdings Group has established a blockchain technology alliance to integrate internal and external blockchain-related resources, driving research, development, and application of blockchain technology. This initiative explores the application of blockchain technology in fields such as finance, insurance, logistics, healthcare, and data security. Through the secure, transparent, and tamper-proof characteristics of blockchain's distributed database, decentralized transactions can be achieved, leading to reduced transaction costs, increased transaction speed, and enhanced transaction transparency. This contributes to propelling the digital transformation of the financial industry and reinforcing the security and stability of the financial system. It addresses common challenges faced by the industry.

For instance, blockchain technology in the financial sector can be applied to prevent insurance fraud. Insurance companies can establish an immutable database on the blockchain to store policy information, claim applications, and related data. This enables insurance companies to more easily identify fraudulent claim applications and process legitimate claims more rapidly. Additionally, the transparency of data on the blockchain allows all participants to access its contents, making it easier for insurance companies to spot suspicious claims. Blockchain technology can also find applications in supply chain management, the Internet of Things (IoT), smart cities, and more. For example, it can be used to create a logistics tracing system, enhancing transparency and efficiency in transportation, enabling better monitoring and management of the product's journey. Therefore, the establishment of a blockchain alliance by Cathay Financial Holdings not only improves industry efficiency and enhances societal welfare but also stimulates innovative development in the financial and other sectors, generating more significant social value.

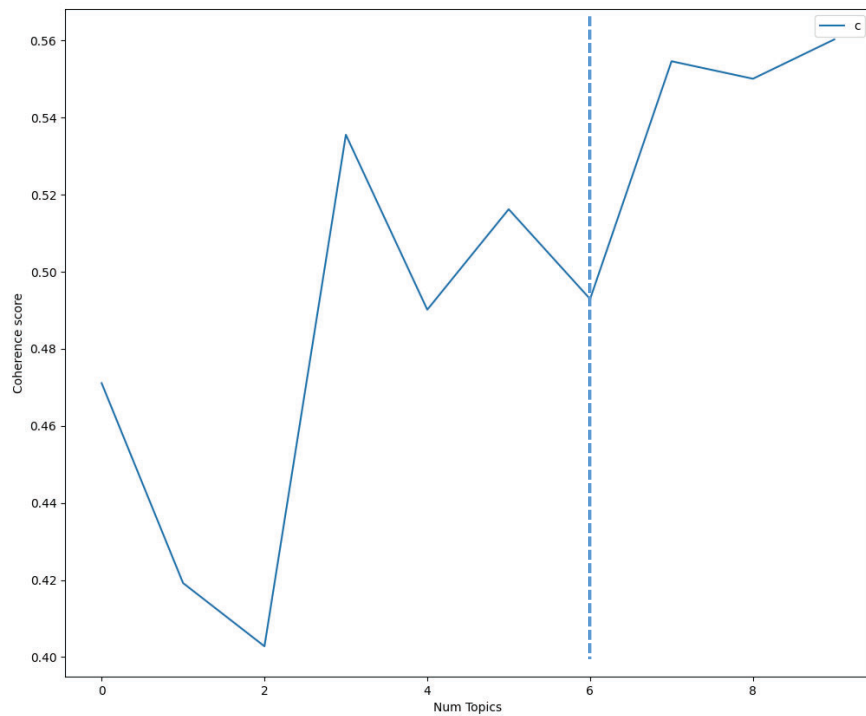


Figure 9 Coherence score under different topics for Cathay Financials

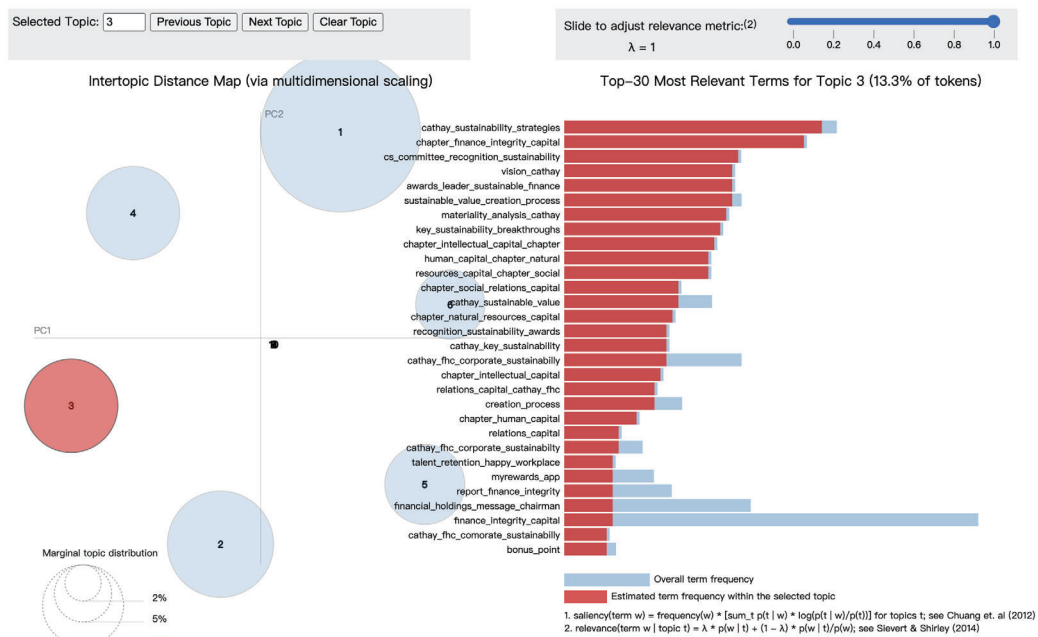


Figure 10 Visualization results using pyLDAvis for Cathay Financials

4.6 Fubon Financials' Topics

From the selected key thematic terms, it's evident that Fubon Financial Holdings emphasizes its brand value in the sustainable finance domain through topics related to “innovation.” For instance, terms like “innovative financial” and “innovative service” are highlighted:

“Innovative Services: The financial industry is actively utilizing technology to enhance service efficiency, create new models, businesses, processes, and products. Fubon Financial Holdings is no exception, focusing on financial technology, big data, and intellectual property to optimize financial technology services. Within this framework, integrating internal and external resources to foster cross-industry collaboration and opportunities, and building new ecosystems, is key to Fubon’s vision of providing more inclusive and customized financial services.”

Upon careful exploration of Fubon Financial Holdings’ official website and its released sustainability reports, it becomes evident that the company is committed to building innovative FinTech financial services. It has introduced Robotic Process Automation (RPA) to accelerate digital transformation, developed smart customer service, and multiple payment services to connect digital accounts. The company has also actively invested in the field of big data. For example, in the health system platform, the utilization of big data analytics helps segment customers and assess potential coverage gaps. Fubon is also actively engaged in intellectual property development, as seen in the patent research for its insurance transaction risk assessment system, which detects abnormal risks. When innovative finance becomes an integral part of the company’s DNA, it enhances customer acquisition and overall customer value.

“In the financial industry, investing in big data infrastructure and research is critical for marketing and risk management operations. In recent years, Fubon Financial Holdings and its subsidiaries have been actively driving data-driven development, providing intelligent services, enhancing customer experiences, and expanding customer bases for each subsidiary, thus delivering greater customer value.”

Furthermore, the strategies related to green operations include reducing the environmental impact of business operations. This is achieved by lowering operational carbon emissions, implementing green procurement/supplier sustainability management, and setting carbon reduction targets to ensure greater environmental sustainability:

“Fubon Life Insurance has aligned its energy-saving, carbon-reducing, and green insurance services with ISO certification standards, setting benchmarks for internal sustainability development. It also supports green procurement and a green value chain, expanding the promotion of ESG-themed investments to strike a balance between economic activities and environmental conservation, ensuring a brighter future for our planet. The influence of these core capabilities continues to grow.”

Green finance is also a policy that Fubon Financial Holdings actively invests in

and develops. The company has introduced various green financial products and services, including green bonds, green loans, and green insurance. For instance, green bonds are used to support multiple green projects such as solar energy and wind energy. Green loan products encompass financing for solar power generation, energy efficiency projects, and other green initiatives. Green insurance products include offerings like eco-friendly car insurance and green travel insurance. For example, these products provide environmentally-conscious vehicle owners with more favorable premiums and coverage, thereby encouraging customers to adopt a more sustainable lifestyle.

Fubon Financial Holdings has also launched innovations and investments in the realm of digital finance. For example, customers can manage their deposits, investments, insurance, and other assets through the digital account platform. Recently, Fubon even introduced a Green Sustainable Time Deposit, with the aim of channeling corporate clients' funds into sustainable development initiatives. This allows businesses to engage in green finance in a low-risk and more convenient manner. Additionally, leveraging big data analytics, the company offers intelligent insurance products and services. For instance, customer health evaluations are used to assess risk levels, and these insights are used to provide tailored insurance plans that align with individual needs. This approach promotes health management, resulting in more precise insurance underwriting, and thereby embodies the core principles of sustainable finance.

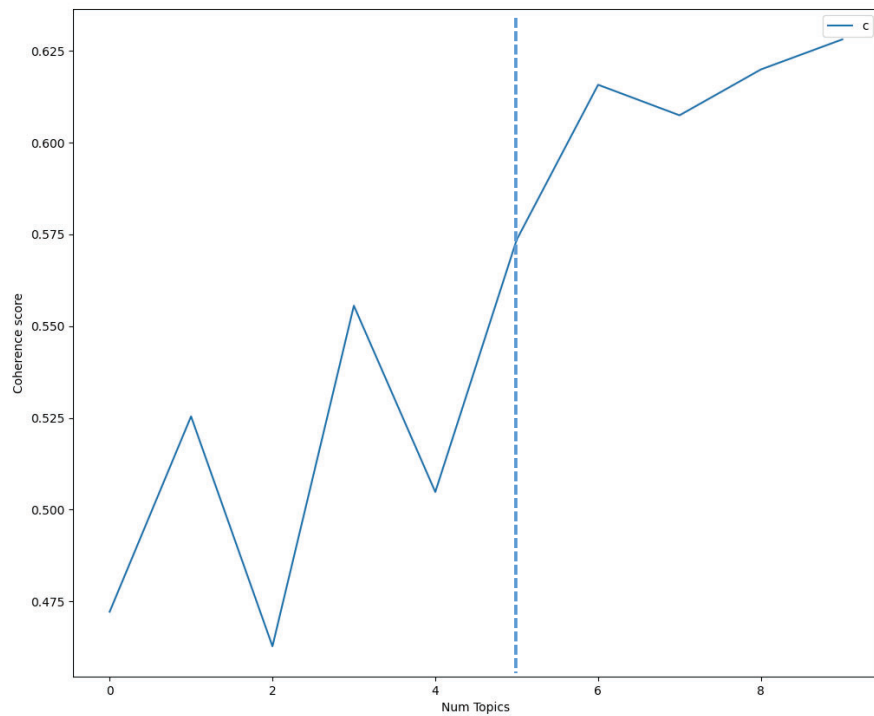


Figure 11 Coherence score under different topics for Fubon Financials

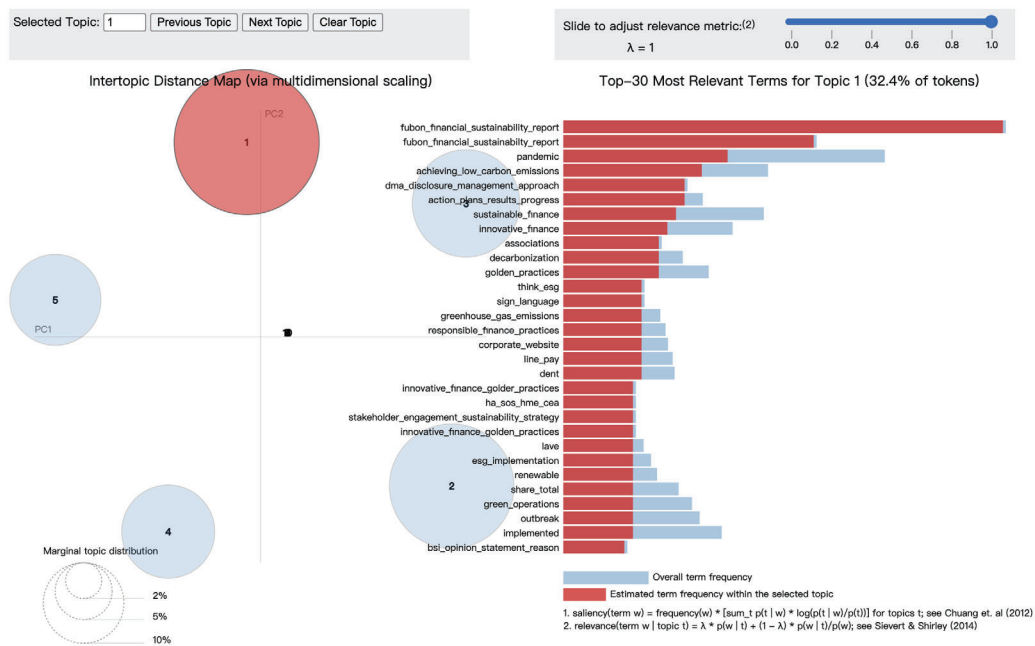


Figure 12 Visualization results using pyLDAvis for Fubon Financials

4.7 China Development Financials' Topics

In addition to the three major aspects of ESG disclosure, another significant topic in Fubon Financial Holdings' development is "Intelligent Finance." For the company, within the context of promoting sustainability, terms such as "product responsibility" are present, signifying that alongside pursuing financial performance, it's crucial to evaluate how the company's investment targets perform in terms of ESG aspects. This approach allows the company to generate social impact while seeking profitability.

Furthermore, terms like "intelligent finance" and "sustainable insurance" are also prevalent:

"As the latest technological trends and user demands brought about by the rapid global digitization process, digital finance is being employed to swiftly meet customer needs. Through the power of technology and high-quality service, Fubon Financial Holdings can enhance customer experiences and create value for its customers."

We can also observe how, in the rapidly evolving technological landscape, digital finance is utilized to address user needs and enhance customer experiences, thus creating value for customers. Ensuring a smoother experience for customers is a paramount concern for China Development Financial.

"By embodying sustainable insurance principles, we deeply integrate the concept of sustainability into our corporate philosophy. From product design, sales, and underwriting to investment management and after-sales service, ESG practices are incorporated into every aspect. These principles serve as the foundation of our decision-making processes, helping us achieve the vision of becoming Taiwan's most recommended and trustworthy life insurance company."

It is evident that the group is also applying technology to various financial services it provides, including significant developments in sustainable insurance. Moreover, in the realm of innovative digital finance, the products and services offered encompass digital loans, enabling customers to apply for loans online 24/7 and automating the loan application and disbursement processes.

Furthermore, China Development Financial has collaborated with iCHEF. Besides creating models to predict restaurant closure probabilities, enabling effective monitoring of operational variables, the company has taken a step further by integrating online loan applications. This integration has led to the launch of the "iCHEF Restaurant Loan" service, assisting restaurant owners in accessing funds more conveniently and efficiently during their funding processes.

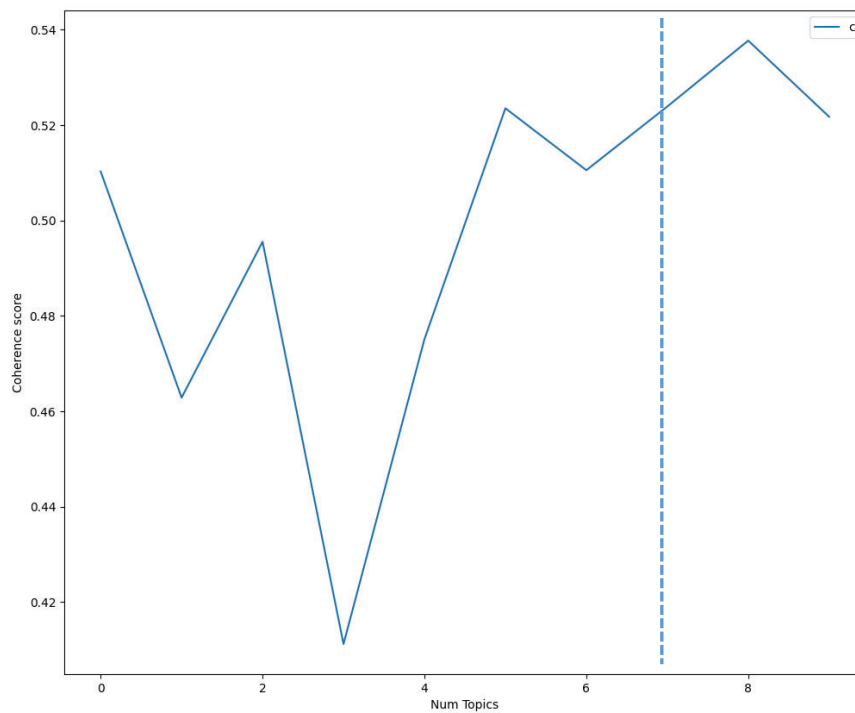


Figure 13 Coherence score under different topics for China Development Financials

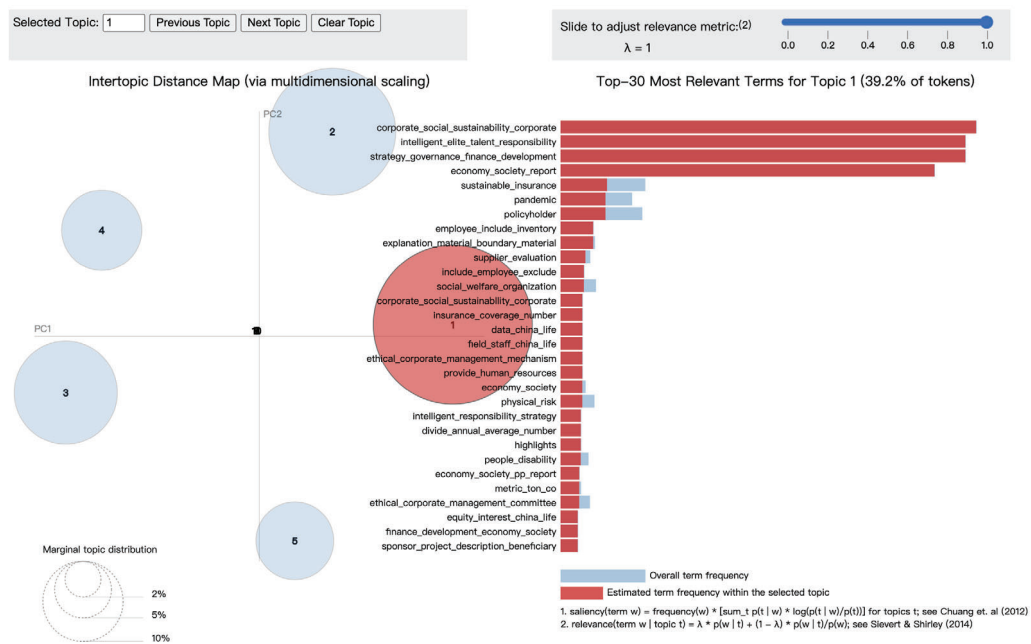


Figure 14 Visualization results using pyLDAvis for China Development Financials

4.8 China Steel's Topics

From the selected keywords, it's evident that aside from using specialized terminology related to the steel industry such as “bolt,” “nut,” “cinder,” “fly ash,” and “coal,” among others, the most representative keywords used by the company are “steel scrap” and “hazardous substance control.” These keywords emphasize the company's commitment to addressing the high pollution associated with the steel industry:

“China Steel incorporates the ‘compliance rate of harmful substances in qualified steel products’ indicator into its departmental operational guidelines, and it's included in management and tracking. By promoting the IECQ HSPM QC 080000 Hazardous Substance Process Management, the company has established a management system for hazardous substances. Annual internal and external audits as well as management reviews of the IECQ HSPM QC 080000 Hazardous Substance Process Management System are conducted to achieve continuous improvement. Additionally, in 2021, the company successfully underwent a certification renewal audit by the British Standards Institution, ensuring the ongoing validity of the certification.”

Further exploration reveals that a wide range of steel products are required for various purposes, including shipbuilding, bridges, and pipelines that need steel plates; wire spools for screws, nuts, steel cables, and steel wires; electromagnetic steel coils for electric vehicles, electric boats, household appliances, and compressors. It's evident that steel has an extensive range of applications. Additionally, steel is a vital material for modern society's infrastructure and serves as the fundamental framework for properties like houses, making it indispensable in daily life. However, the significant pollution arising from the steel industry cannot be underestimated. The steel production process generates substantial amounts of greenhouse gases, contributing to climate change. As countries and organizations worldwide strongly advocate for carbon reduction, the steel industry is facing increasing pressure to reduce its high carbon emissions.

In light of this, by closely examining the sustainability report in conjunction with the keywords, it becomes evident that China Steel emphasizes the sustainable management of raw materials. This involves incorporating critical materials like scrap steel into the product life cycle management, enabling resource circulation and reuse. This approach is particularly relevant because China Steel operates an integrated steel mill, which means it handles the entire steel production process from raw materials to finished products. In its processes, materials like coal, iron ore, and stone are used, and scrap steel is mixed and processed along with these materials. Since the company uses its own generated scrap steel and sells excess scrap to the group's subsidiary, China Dragon, it effectively achieves the benefits of a circular economy:

“Control the use of critical materials, including managing the life cycle of sustainable materials, to promote the sustainable use of raw materials. Tangible achievements include the use of self-

produced steel scrap in the production process to facilitate the continuous use of raw materials. China Steel also achieves complete recycling and reuse of the waste acid generated in the process, reducing costs associated with purchasing hydrochloric acid, outsourcing transportation, and disposal.”

Similarly, it's evident that China Steel is taking proactive steps to minimize the impact of pollution on society and the environment. This includes actively promoting hazardous substance process management by implementing well-defined processes and establishing a series of management systems. For instance, during the stages of product development, design, and manufacturing, the company avoids using materials listed as hazardous substances and even bans the use of substances with significant environmental impacts. This is in alignment with international standards, ensuring compliance with customer requirements and international regulations. During the execution phase, relevant personnel are trained to manage, assess, and supervise external suppliers regarding hazardous substances. Regular audits of the hazardous substance management system are conducted, often involving third-party testing to assess the levels of harmful substances in products. Continuous improvement is emphasized throughout these processes, enhancing overall management procedures to facilitate subsequent tracking and review.

Additionally, China Steel's green processes are not limited to its core business. We can observe this from the inclusion of the term “jacket foundation” in the context:

“Subsea infrastructure has a higher proportion of total costs and stricter quality requirements. Therefore, in collaboration with renowned foreign steel structure experts, a production line is established in Xingda Port. China Steel is also committed to providing local human resources, offering consultation and support to downstream manufacturers to establish a complete supply chain. Sustainable production is expected to meet the demand for subsea infrastructure from domestic offshore wind farm developers.”

Although offshore wind power is not directly within the steel domain, it represents the highest steel demand among renewable energy sources. To support green energy policies, the company chooses to engage in the manufacturing of subsea foundation structures, producing steel for wind farms, and constructing the supply chain for wind turbine components. This commitment aims to foster the overall development of the offshore wind power industry through core technologies, while also driving related investments and business opportunities.

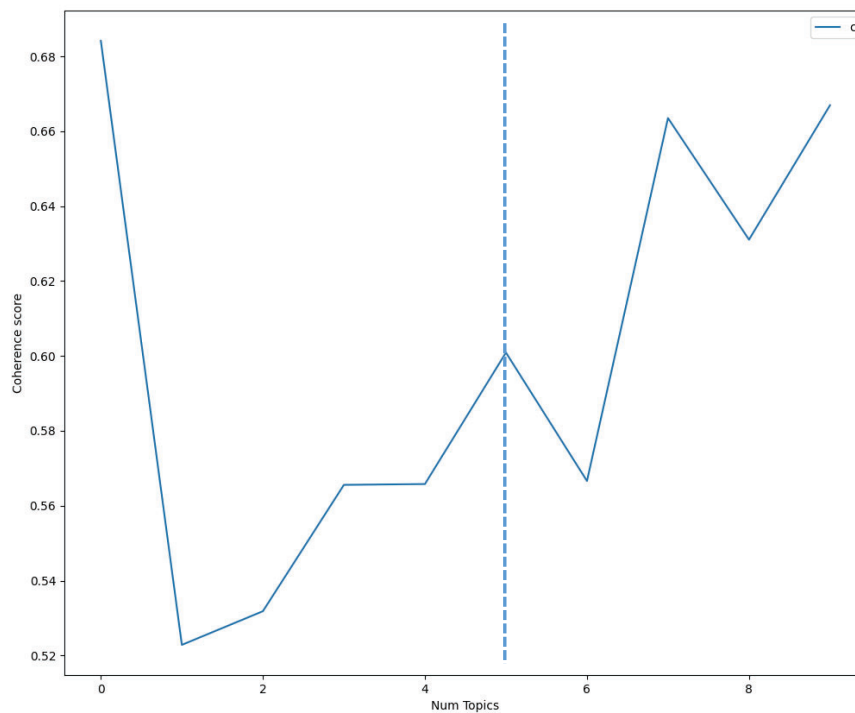


Figure 15 Coherence score under different topics for China Steel

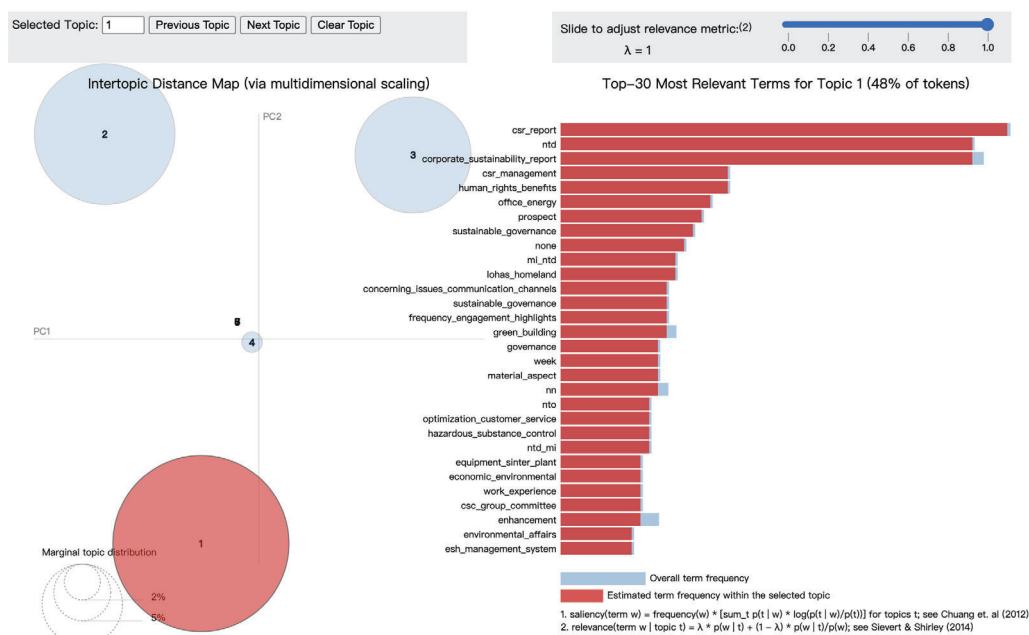


Figure 16 Visualization results using pyLDAvis for China Steel

4.9 Nan Ya Plastics' Topics

From the report and the highlighted keywords, it's evident that Nan Ya Plastics Group places significant emphasis on “environmental pollution” and “industrial environmental safety.” For instance, regarding environmental pollution, terms like “hazardous material,” “chemical substance,” “control chemical substance,” and “Mailiao site” (referring to the Mailiao plant site) are mentioned. On the industrial safety front, terms like “PSM” (Process Safety Management), and “safety” also appear:

“Nan Ya Plastics Group values the health and safety of its customers and continually improves operational processes (such as reducing harmful formulations, promoting energy-saving technologies, and developing recycled products). To meet market trends and downstream customer demands, we are moving towards non-toxic production, environmentally-friendly production, process improvement, and the development of green production process products.”

We speculate that Formosa Plastics Group, similar to the previous case of CSC (China Steel), is also a high-polluting industry. According to statistics from the Environmental Protection Administration's greenhouse gas registry platform, Formosa Plastics Group has the highest carbon emissions in the country. Given the strong regulatory focus on this industry and the pollution controversy surrounding the Formosa Petrochemical's Sixth Naphtha Cracker Project (Linyuan Refinery), a study by Professor Chan from the College of Public Health at National Taiwan University in 2009 indicated that after the establishment of the Linyuan Refinery, the levels of toxic substances in the air in its immediate vicinity were not only higher than in other townships, but the cancer incidence rate was also elevated. This risk increased gradually with the operation of the Linyuan Refinery. The public opinion pressure generated by this study's findings led to specific emphasis on air pollution in their report. Additionally, Nan Ya Plastics considers these researchers as stakeholders, highlighting their influence on the company.

A closer examination of the sustainability report reveals that in terms of air pollution prevention and control, Nan Ya Plastics adheres to the principle of Best Available Control Technology (BACT), effectively reducing pollution at the source through resource optimization to minimize environmental impact. Through a three-stage control process, they ensure the legality of their operations, achieving “optimal control equipment.” These three stages consist of: qualification review (providing relevant documents) to establish basic information; initiating the cleaning process after identity verification, with continuous supervision throughout the process; upon completion of cleaning, random on-site visits are conducted by personnel.

The process of reducing pollution and maintaining optimal equipment conditions

involves continuous improvement based on process characteristics, regular equipment maintenance, and ongoing personnel education to enhance familiarity with system operations. By optimizing and enhancing control technologies and pollution prevention systems, coupled with real-time monitoring and anomaly alert notifications, along with a comprehensive audit of air pollution emissions in the Sixth Naphtha Cracker Project, effective regulation is achieved. In terms of chemical substance management, operational regulations are also strictly enforced, combined with measures such as computerized control operations, to prevent environmental pollution caused by leaks and minimize potential risks to human health.

Given the significant impact of the Sixth Naphtha Cracker Project on the local community, it has come to our attention that Nan Ya Plastics has taken various measures to provide healthcare services for the residents of Mailiao. For instance, the company has engaged National Cheng Kung University to assess the health risks posed by harmful air pollutants. Additionally, in an effort to enhance the medical quality in the region, they have established the Yunlin Chang Gung Hospital. Leveraging the resources of the Chang Gung system, they are actively promoting health promotion and hygiene education to deeply engage with the community, with the aim of setting up a model for others to follow.

In terms of industrial safety, there have been several incidents of explosions and fires within the Formosa Plastics Group, including the Ma'iloa naphtha cracker plant fire and incidents at the Nan Ya company's isobutanol plant involving public pipeline fires, pipeline residue leaks, fires caused by high-temperature steam, flange leaks, and gas leaks such as ethylene and methane. With growing public concern over air pollution and increasing environmental awareness, health and industrial safety controversies arising from the Formosa Plastics Group's Sixth Naphtha Cracker Project have become a pressing issue for the company. Regarding product safety, the company has implemented the following strategies:

“Each member of the research and development team recognizes the importance of high-performance materials, multifunctional products, and high-level process control as critical pathways for development. This approach not only contributes to extending the lifespan of the final products and improving material processing performance but also ensures the safety of industrial manufacturers, customers, and the environment. Additionally, it allows for the expansion of functionality and applications of general-purpose and cost-effective materials.”

Furthermore, we can observe from the sustainability report that “Zero Accidents in Health, Safety, and Environment (HSE) and Ensuring Sustainable Operations” has become a paramount goal for the Formosa Plastics Group. The emphasis has shifted towards a balanced approach where industrial development and environmental

protection are both prioritized. As a result, the term “PSM” (Process Safety Management) can be found throughout the report. The company has incorporated this concept of industrial safety into its occupational health and safety management to prevent occupational hazards for on-site personnel. When PSM is effectively implemented, it enables the early detection of potential risks and allows for the proactive elimination of those risks. Through various forms of process safety hazards and assessment analyses, the company has integrated industrial safety into the technical aspects of its operations, ensuring effective risk management and control. This underscores the Formosa Plastics Group’s commitment to promoting industrial safety on a technological level and aligning it with their sustainability goals.

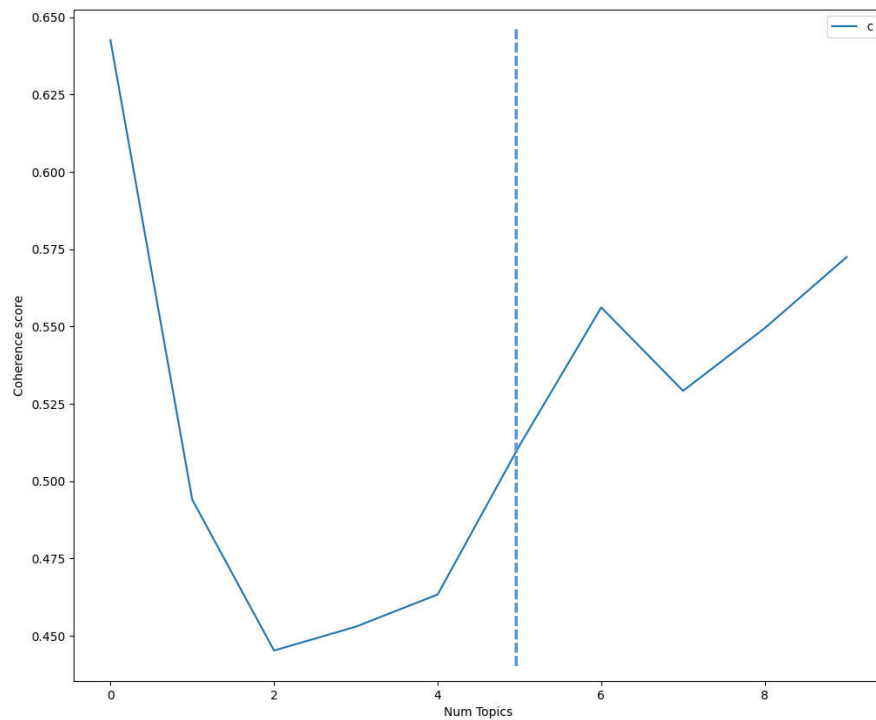


Figure 17 Coherence score under different topics for Nan Ya Plastic

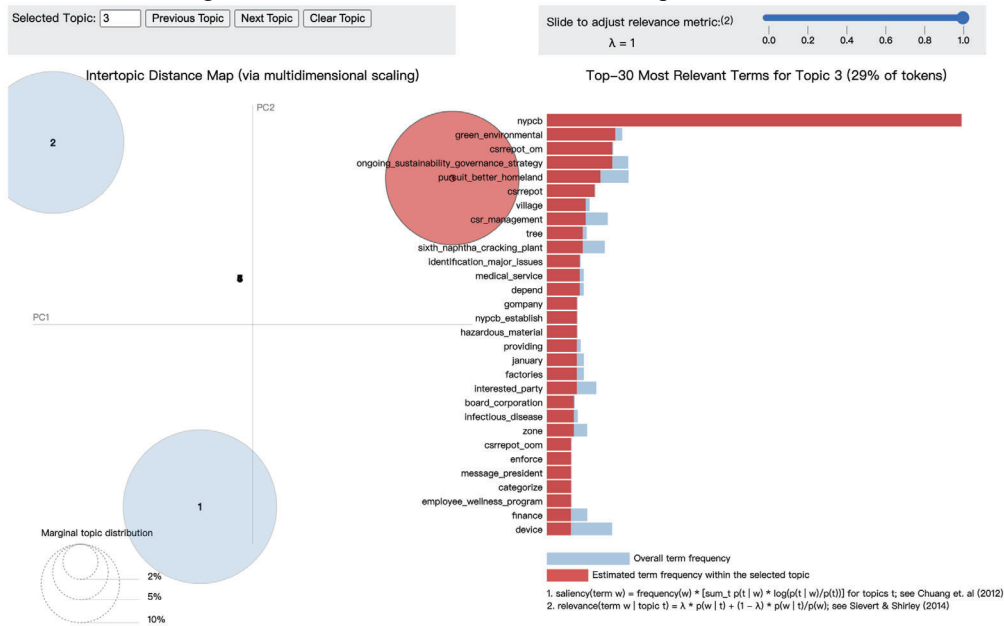


Figure 18 Visualization results using pyLDAvis for Nan Ya Plastics

4.10 Eva Air's Topics

From the report of EVA Air, it is evident that the company places significant emphasis on “flight safety” and “customer service” as key characteristics. For instance, terms like “flight safety,” “training,” and “risk” are repeatedly mentioned in the context of flight safety, while terms like “customer service” and “passenger” are frequently referenced in relation to their customer service efforts.

“Since the inception of its flight operations, EVA Air has been dedicated to flight safety and service excellence, with the ultimate goal of becoming a globally influential and iconic airline. EVA Air implements a range of risk management and control measures, sets annual safety performance indicators, and regularly reviews the effectiveness of its Safety Management System (SMS) through a Safety Promotion Committee. The company’s efforts extend to the formulation of Standard Operating Procedures (SOPs), personnel training, and operational monitoring, all aimed at preventing the occurrence of any adverse events.”

Further exploration reveals that for the aviation industry, achieving zero accidents is the ultimate goal, providing a safe environment to serve customers is a paramount objective, and compromising on safety is never an option. The motto of “striving for improvement, not perfection” is evident, with passenger safety taking precedence. This is why the term “training” is included in the core topics. EVA Air establishes educational programs related to aviation safety, and through the implementation of the Safety Management System (SMS), this philosophy is ingrained in the management approach. Furthermore, EVA Air has established a Safety Action Team and a Safety Promotion Committee. A series of courses and educational training efforts have been put in place to integrate risk management into employees’ daily operations and logical thinking. This approach aims to formulate strategies and relevant procedures. Additionally, artificial intelligence is employed to apply advanced technology in integrating and analyzing flight information and data. This systematic approach allows for a more comprehensive understanding of the company’s flight risk management operations and contributes to the establishment of a proactive safety culture.

In addition, recognizing that customers are EVA Air’s primary revenue source and aiming to attain a world-class position within the airline industry, the company employs a series of service value chains to provide passengers with high-quality services:

“Becoming the world’s best airline has always been EVA Air’s goal. We diligently uphold our service commitments: to pay attention to customer needs and respond proactively; to genuinely care for limited resources and the environment, sharing boundless service with our neighbors; to warmly welcome guests, treating customers as family and building a warm and friendly relationship. EVA Air cares about passenger needs and consistently strives to offer a better customer service experience. In 2021, the aviation industry continued to face the severe challenges of COVID-19. EVA Air prioritizes passenger safety and travel convenience. We introduced the ‘C+ Travel - Safe Travel’ program to ensure passengers travel safely at every stage of their journey, from pre-flight preparation, departure, and in-flight experience to arriving at their destination. We

remain committed to providing attentive, genuine, and enthusiastic service, ensuring that passengers travel safely at every step of their journey.”

For example, starting with flight training and the manufacturing of aviation-related components, EVA Air extends its operations to encompass logistical services (such as ground handling, in-flight catering, and aircraft maintenance), culminating in end-to-end customer service, merchandise sales, and cargo services. A comprehensive plan is executed to ensure a seamless experience throughout the entire service value chain. By capturing consumer satisfaction and feedback, the company initiates reviews and improvements to enhance the quality of customer service. This continuous improvement approach ensures that each service interaction creates opportunities for repeat service, enhances customer loyalty, and ultimately maximizes revenue generation.

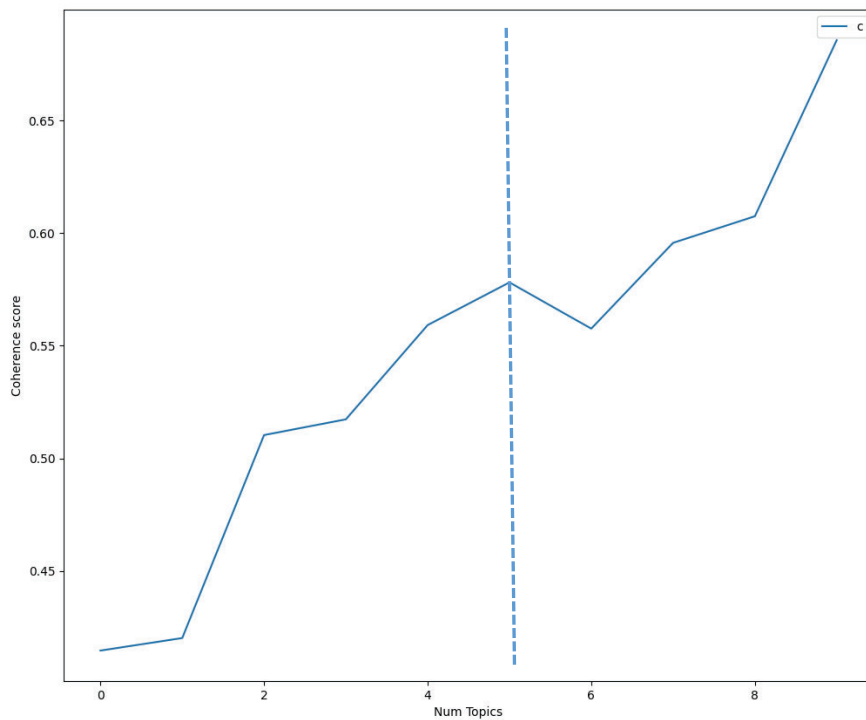


Figure 19 Coherence score under different topics for Eva Air

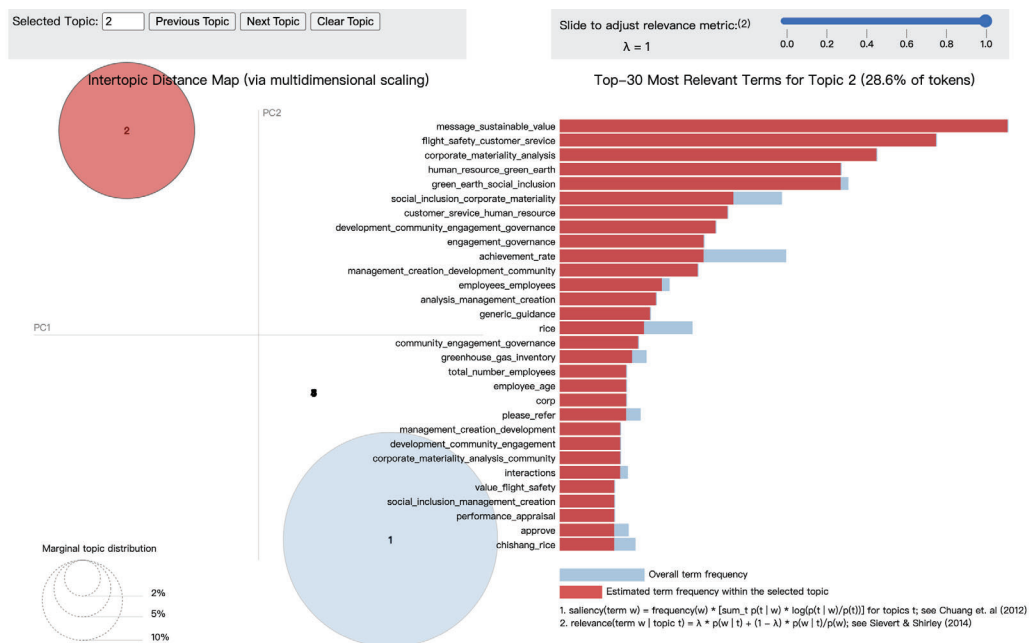


Figure 20 Visualization results using pyLDAvis for Eva Air

4.11 President Chain Store's Topics

From the selected keywords, it's evident that President Chain Store places importance on the issues of "food waste" and "product safety." Particularly in terms of product safety, various related terms such as "explanation material boundary," "quality test laboratory," and "material issues" are mentioned:

"Food waste is not only about the wastage of raw materials but also involves the consumption of resources during the food production process, including land, water, energy, and labor, which can lead to food safety concerns. Food waste also contributes to greenhouse gas emissions when decomposing in landfills. Therefore, the urgency to reduce food waste is self-evident."

"As part of the retail industry, PCSC is closely connected with the food sector. It takes responsibility for reducing food waste across the three stages of 'production,' 'order and shipment,' and 'retail.' In 2021, under the Sustainable Development Committee, a 'Food Waste Management Project Team' was established. This team regularly reports project progress to the Sustainable Development Committee to demonstrate PCSC's determination to minimize food waste."

Considering the United Nations Environment Programme's (UNEP) 2021 Food Waste Index Report, which highlights that the world wastes up to 930 million tons of food annually, leading to global pollution, biodiversity deterioration, and contributing to the climate crisis, along with the Food and Agriculture Organization's (FAO) statistic that nearly one-third of the food we produce ends up being discarded, resulting in significant carbon emissions with profound environmental impacts, it's evident that food waste is a critical issue. Given that stores and restaurants are among the sources of food waste, being a part of the food supply chain, President Chain Store actively strived to address the issue of food waste. The recognition of their role in tackling this problem is vital in minimizing its negative consequences on the environment and society.

Upon delving into the sustainability report, it becomes evident that President Chain Store, positioned within the retail industry, initiated the "i Cherish Food" program starting from 2020. Through the implementation of an "Intelligent Labeling System," the company proactively alerts customers about products that are nearing their expiration dates. This control mechanism helps manage the shelf life of food items. Moreover, for over a hundred different products, the store offers discounted promotions on items that are within 8 hours of their expiration time, aiming to reduce the likelihood of food waste.

In terms of "raw materials," President Chain Store selects products without preservatives, reducing waste in the production process. In "logistics," the store employs low-temperature distribution to minimize food waste caused by microbial growth due to temperature deviations. Through a sales forecasting and ordering system,

the “Store Ordering” process becomes more accurate, reducing surplus and excess inventory. Through this array of strategies, the company endeavors to proactively prevent food waste from occurring.

Additionally, it can be speculated that due to past food safety incidents within the President Chain Store, such as the plasticizer incident and the use of problematic clouding agents resulting in excessive plasticizers in various products, as well as being affected by Taiwan’s edible oil scandal (also known as the “black heart oil incident”), where many products manufactured by the President Chain Store contained substandard oil, leading to food safety concerns and recalls, the group has started to emphasize the significance of food safety.

“To effectively monitor product safety and fulfill the responsibilities of the retail industry, President Chain Store collaborates with the Taiwan Food Development Association to establish a Material Assurance System (MAS) for its private-label products. This system aims to track and manage product raw materials and suppliers. The key document of the MAS system is the product specification document, which records the origin of raw materials and suppliers. As of the end of 2021, 100% of the private-label food products have corresponding product specification documents within the MAS system.”

President Chain Store has established a Product Safety Committee to enforce a series of regulations concerning product safety and quality. In the event of non-compliant products or negative news reports related to their private-label products, the company follows operational standards to further comprehend and manage information about product safety. They have also set up a Material and Quality Assurance System (MAS) to ensure traceability of raw materials. This system utilizes quality management databases and private-label product material databases. Furthermore, President Chain Store has gone a step further by establishing a quality inspection laboratory. Through chemical or microbiological methods, products are sampled and tested, allowing for quality control. This is coupled with various audits and continuous monitoring to ensure ongoing improvements, all in an effort to safeguard product safety and quality. These measures reflect the company’s dedication to enhancing product safety and ensuring that their products meet high-quality standards.

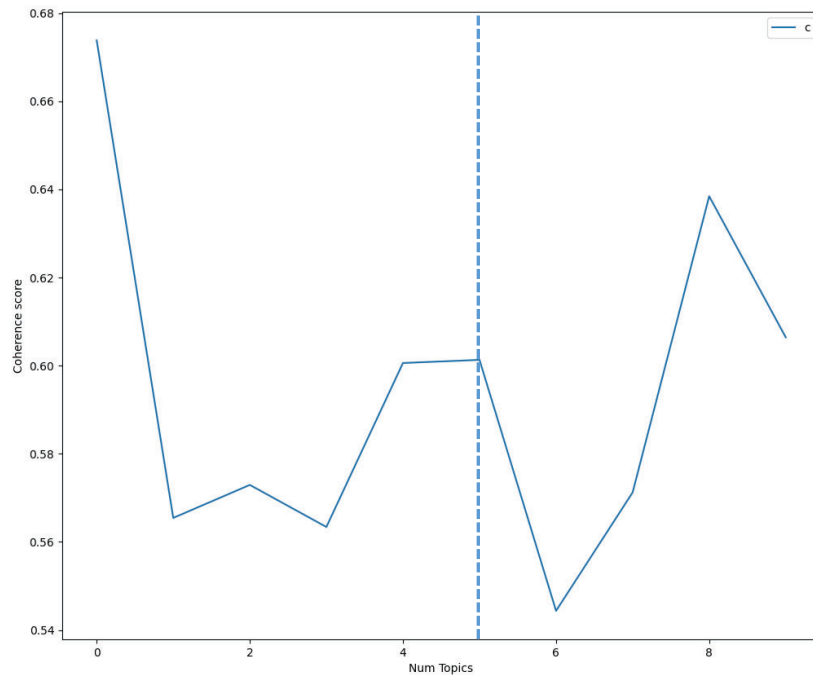


Figure 21 Coherence score under different topics for President Chain Store

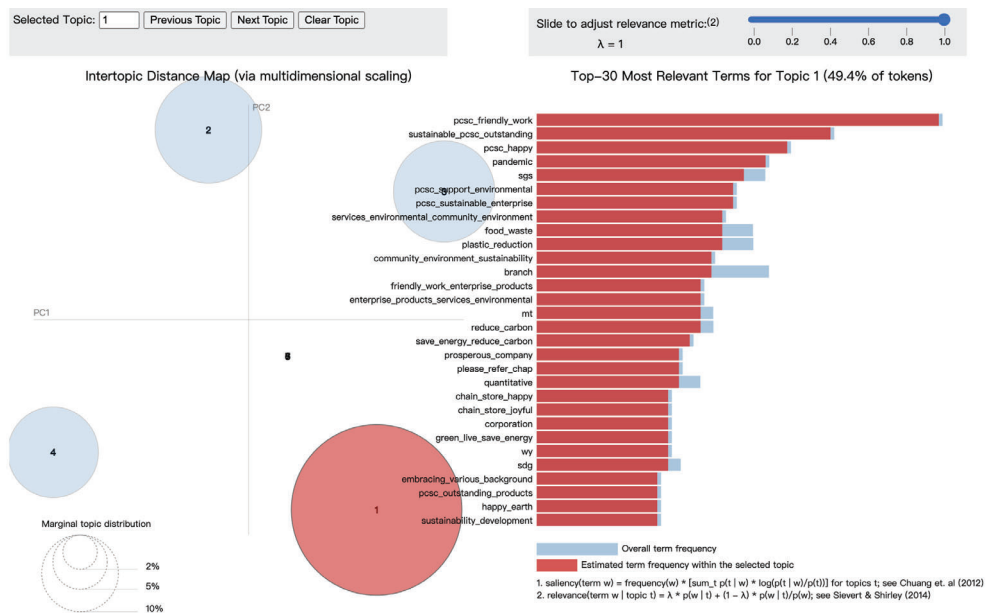


Figure 22 Visualization results using pyLDAvis for President Chain Store

4.12 Far Eastern New Century's Topics

Based on our research findings, it is evident that Far East Century Group maintains a balanced discourse on the three dimensions of ESG, both in terms of thematic vocabulary and sustainability reports. Further examination of the group's sustainability reports reveals its positioning as a “comprehensive practitioner of ESG,” committed to achieving balanced development in the realms of Environment (E), Social (S), and Corporate Governance (G) within the context of sustainability. The company believes that through a comprehensive system of sustainable management and governance structure, it can sustain its long-term competitive advantage:

“Far East Century is dedicated to the long-term balanced and sustainable development of Environment, Social, and Corporate Governance (ESG). The company values feedback from all stakeholders and responds proactively. With a comprehensive framework of sustainable governance and high-standard management systems, the company is capable of maintaining strong performance and competitive advantage in a rapidly changing environment. We are confident in seizing new opportunities, creating new models, taking appropriate actions in the pursuit of sustainability, and generating mutually beneficial outcomes and prosperity for the company, society, and the environment.”

A sustainability report that focuses on the three dimensions of ESG serves not only to comprehensively reflect a company's sustainable development status and meet investors' demands but also to emphasize the integrated value of the “group” as a whole, rather than solely emphasizing specific economic benefits.

Furthermore, a second point that this research identifies is that the company maintains balanced development across the three dimensions of ESG due to its nature as an integrated conglomerate. While the scope of the report encompasses companies like Far Eastern Textile and Far Eastern Petrochemical, it still leans towards a collective concept and adopts a strategy of vertical integration in the polyester industry. As a result, the company naturally extends its focus and efforts to each dimension.

To discern significant differences from the report, further exploration into the sustainability reports of other subsidiaries within the conglomerate can be undertaken. Companies like Asia Cement, Far Eastern Department Stores, and Far Eastern International Bank, among others, are key entities within the Far Eastern Group. This deeper analysis would facilitate a more comprehensive research effort.

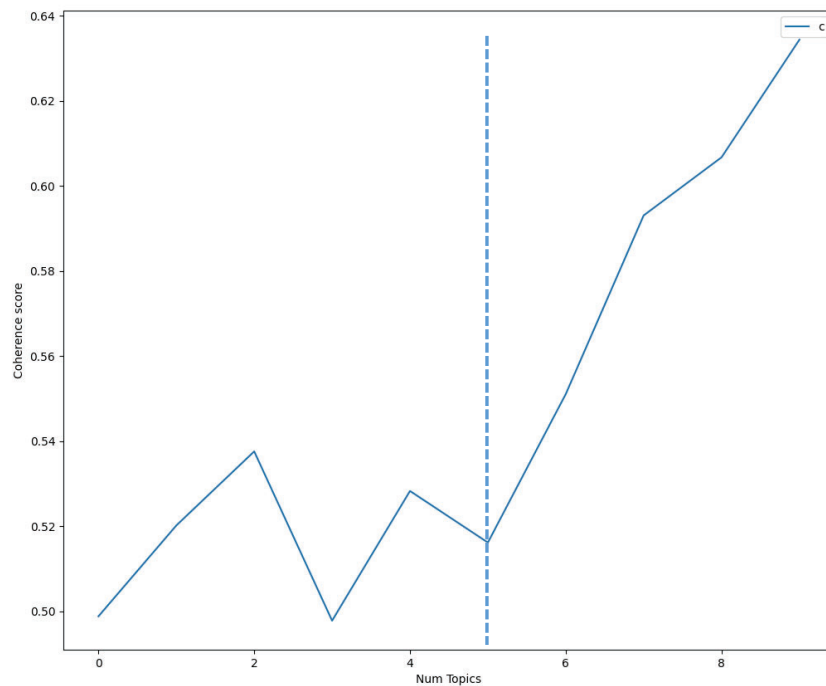


Figure 23 Coherence score under different topics for Far Eastern New Century

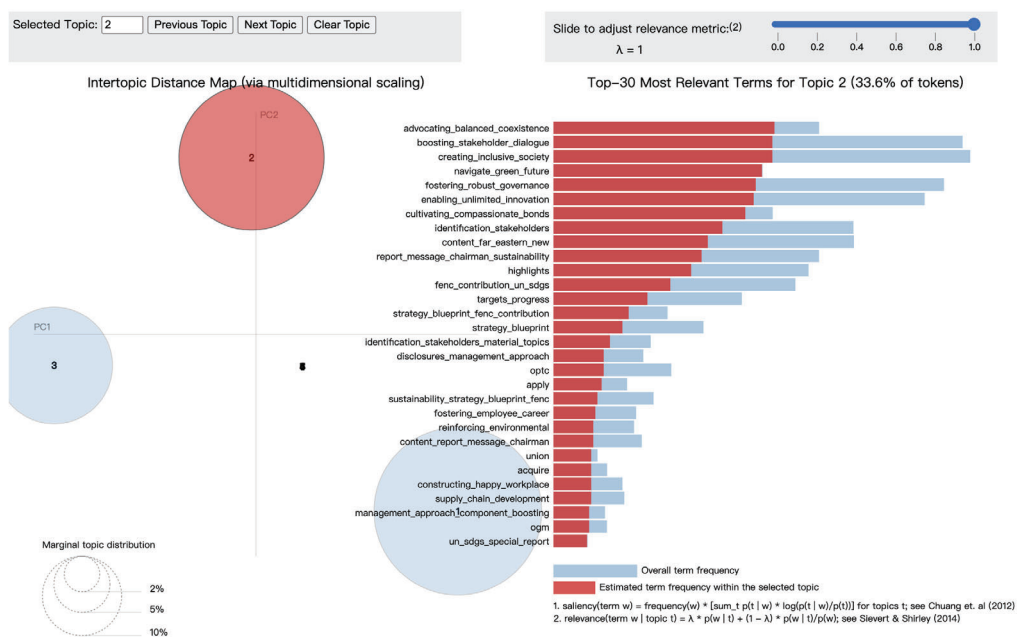


Figure 24 Visualization results using pyLDAvis for Far Eastern New Century

CHAPTER FIVE: DISCUSSION

5.1 Theoretical Implications

This study provides significant theoretical and practical implications for the intersection of ESG and branding strategies. Past research related to ESG scoring has primarily focused on the performance associated with Corporate Social Responsibility (CSR), measuring ESG through various indicators (such as GRI, SASB guidelines), and investigating their relationship with financial performance (Amel-Zadeh and Serafeim, 2018; Kim and Yoon, 2023). In essence, most previous studies have predominantly sought to understand a company's ESG strategy from the perspectives of economic rationality and the market.

The main theoretical implications and contributions of this article lie in providing a perspective of social cognition and linguistic strategy to comprehend the ESG strategies and behaviors of different industries and companies. Our research reveals that, taking the technology industry as an example, MediaTek, an IC design company, places a greater emphasis on advanced technology research and leadership. TSMC, due to its high degree of internationalization and the highest proportion of foreign ownership, comparatively focuses on “financial performance,” viewing sustainable business as established upon a solid financial foundation. Foxconn, on the other hand, places special emphasis on employee occupational safety and health, particularly due to a series of employee suicide incidents within its facilities. Acer's founder, Stan Shih, introduced the “smiling curve” concept to redefine and legitimize Acer's transition from an ODM manufacturer to a proprietary brand manufacturer. Hence, Acer places significant emphasis on the corporate “brand vision.”

In the financial sector, the three financial holding companies mentioned in this study present similar developmental objectives in their sustainability reports. Apart from the three dimensions of environment (E), social (S), and corporate governance (G), all of them emphasize “sustainable finance.” They place a strong focus on how emerging technologies drive digital transformation within industries, providing safer and higher-quality services to customers. Furthermore, collaboration among financial institutions is also evident, as seen in the establishment of initiatives like the “Blockchain Technology Alliance,” which fosters mutual innovation and development between the financial industry and other sectors. This contributes to the creation of a more comprehensive industrial ecosystem.

In the realm of traditional industries, both China Steel and Nan Ya Plastics, as high-pollution industries, have a significant environmental impact due to the pollutants emitted during their production processes. Consequently, they face higher levels of public scrutiny, leading to increased social pressure. This has caused “environmental pollution” and “hazardous substance management” to become focal points for them. As a response to the global carbon reduction trend, they have established a series of management systems to address these issues.

In the service sector, EVA Air’s ultimate goal is to provide customers with a zero-accident safety environment, hence they prioritize “flight safety” and “customer service.” As a retailer, Taiwan’s FamilyMart has a close association with food management, leading them to address the issue of “food waste” to tackle food surplus problems. Far Eastern Group positions itself as a comprehensive ESG practitioner, enabling a clear balance across the three dimensions of environment (E), social (S), and corporate governance (G) in its thematic terms and reports.

Based on the findings of this study, we emphasize that corporate ESG strategies not only respond to the requirements and pressures of international ESG guidelines, displaying fundamental commonalities, but also showcase distinct areas of emphasis due to variations in their respective industries. In other words, corporate ESG strategies not only account for market factors but also hold symbolic significance as reflections of a company’s business model and strategy.

5.2 Practical Implications

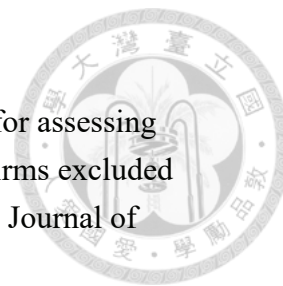
In today’s society, where the emphasis on corporate sustainability and social contribution is growing, the issues related to corporate ESG are gaining increasing attention (Brandon et al., 2021; Gillan et al., 2021; Kim and Yoon, 2023). This study holds significant practical implications for how companies plan and develop their ESG strategies. Firstly, we highlight how an organization’s industry can influence its perspective on ESG. For instance, in the case of high-tech companies, ESG development serves as a means and purpose for shaping the future. Differences in the topics emphasized by various companies reveal their distinct focus on the roles they can play within relevant issues. For the financial industry, given its heavy regulatory pressures, ESG appears to be a response to institutional demands. This is evident in the higher consistency of ESG presentation techniques in their reports, with a primary focus on sustainable finance and digital transformation. In contrast, traditional high-pollution industries show a greater concern for current problems and utilize ESG as a tool and means for organizational transformation.

Our second study also indicates that companies, in their commitment to sustainability, can view ESG as an extension of their overall development strategy. As corporate ESG strategies go beyond being solely a criterion for investors to evaluate a company's implementation of sustainable principles, they also become a source for judging a company's strengths and weaknesses. Companies should not only base their actions on profit enhancement but also consider how to fulfill social responsibilities, uphold environmental and ecological concerns, and actively engage with relevant stakeholders through sustainability reports. This process gradually shapes external perceptions and understanding of the company's ESG strategies. Simultaneously, it allows outsiders to gain a deeper understanding of the company's long-term competitive advantages and development strategies.

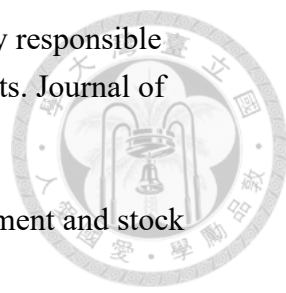
5.3 Limitations and Future Research

The limitations and future research recommendations of this study are divided into the following four points. Firstly, this study used sustainability reports published between 2015 and 2021 as its data source, excluding company websites and press releases as text mining data. Incorporating more secondary data dimensions might influence the research results. Secondly, this study focused on the specific topics emphasized in the reports of various industries in Taiwan. The research outcomes in sustainability reports may differ for industries in different regions or countries. Thirdly, as corporate sustainability reports reflect past ESG actions of companies, future research could explore whether the ESG visions discussed by corporate leaders in public forums align with the directions taken in subsequent sustainability reports. Fourthly, this study investigated differences in emphasis in sustainability reports among high-tech industries, traditional industries, and the financial sector. It is recommended that future research delves deeper into the writing directions specific to certain industries and explores discrepancies in ESG strategies, thus further enriching our understanding of the theoretical and practical implications of corporate ESG strategies.

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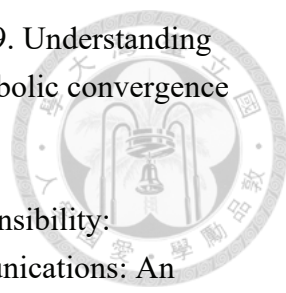
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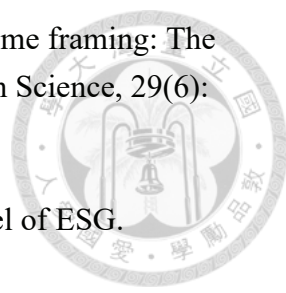
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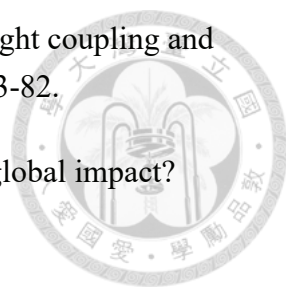
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