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Creating Shared Value (CSV) as a Key Mechanism for Improving Environmental, Social, and Corporate Governance (ESG): A Comparative Research of Taiwan Cement Corporation and Asia Cement Corporation

환경, 사회, 기업 지배구조(ESG) 개선을 위한 핵심
메커니즘으로서의 공유가치창출(CSV): Taiwan Cement
Corporation 과 Asia Cement Corporation 의 비교 연구

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Graduate School of International Studies

Seoul National University

International Commerce Major

HSU, Chia-Hao

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Thesis Advisor: Professor Jeong Hyeok

Submitting a master's thesis of
International Commerce

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Graduate School of International Studies
Seoul National University
International Commerce Major

HSU, Chia-Hao

Confirming the master's thesis written by

HSU, Chia-Hao

August 2023

Chair **Yoon, Semee** (Seal)

Vice Chair **Yin, Wenyan** (Seal)

Examiner **Jeong, Hyeok** (Seal)

Abstract

This study aims to explore the relationship between Creating Shared Value (CSV) and Environmental, Social, and Corporate Governance (ESG) performance in corporations. Taiwan Cement Corporation (TCC Group) and Asia Cement Corporation (ACC Group), the two largest cement companies in Taiwan, were selected as case studies. The analysis was conducted based on ESG reports and annual reports from 2013 to 2021. The results show that companies with better CSV performance can improve their ESG performance. Additionally, the study found that TCC Group performed better in the material topics of energy and circular economy and showed an increasing trend in the proportion of energy business, which contributed to a higher level of CSV than ACC Group and, subsequently, better ESG performance. However, there are limitations in this study, such as CSV being not the only mechanism affecting ESG performance, and further investigation is warranted to delve into other possible mechanisms. The results of this study can provide insights for corporations to integrate CSV into their ESG strategies and execute ESG actions in a way that creates value for both the company and society.

본 연구는 기업의 Creating Shared Value (CSV)와 Environmental, Social, and Corporate Governance (ESG) 성과 간의 관계를 탐색하는 것을 목적으로 한다. 대만에서 가장 큰 2개 시멘트 기업인 TCC 그룹과 ACC 그룹이 케이스 스터디로 선택되었으며, 2013년부터 2021년까지의 ESG 보고서와 연차보고서를 기반으로 분석을 수행하였다. 결과는 CSV 성과가 더 좋은 기업은 ESG 성과를 개선할 수 있다는 것을 보여주고 있다. 또한, TCC 그룹이 에너지와 순환경제라는 핵심 주제에서 더 좋은 성과를 보이며, 에너지 사업의 비율이 점차 늘어나면서 ACC 그룹보다 더 높은 수준의 CSV를 제공하고 이에 따라 더 나은 ESG 성과를 보여주었다. 그러나 CSV가 ESG 성과에 영향을 미치는 유일한 요인은 아니므로 이

연구는 제한적인 면도 있다. 따라서 다른 가능한 요인을 탐색하기 위해 추가 연구가 필요하다. 이 연구 결과는 기업이 CSV를 ESG 전략에 통합하고 회사와 사회 모두에 가치를 창출하는 방식으로 ESG 조치를 실행하는 데 도움을 줄 수 있다.

Key words: Environmental, Social, and Corporate Governance (ESG), Creating Shared Value (CSV), Material Topics, Corporate Social Responsibility (CSR)

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Chapter I. Introduction

Corporate social responsibility (CSR), or more commonly known as environmental, social, and corporate governance (ESG), has become an increasingly important issue in the business world. The concept of Creating Shared Value (CSV) has gained significant recognition as an emerging ESG framework that emphasizes the connection between social and economic value. The concept of CSV was introduced by Porter and Kramer (2006, 2011) and has been the subject of case studies and criticism by scholars. Menghwar and Daood (2021) proposed a definition of CSV with three criteria to judge whether a company's ESG behavior belongs to CSV. However, this definition and criteria have not yet been verified.

This study aims to investigate the relationship between CSV and ESG performance in the Taiwanese cement industry using the CSV definition and criteria proposed by Menghwar and Daood (2021). The lack of empirical evidence on CSV and how it affects ESG performance in the cement industry, which is a major contributor to carbon emissions and other environmental issues, makes this research particularly valuable. The purpose of this study is to explore the impact of CSV on ESG performance and the interaction between the two.

The research methodology employed in this study is a comparative study of TCC Group and ACC Group. Secondary data from these two companies' ESG reports and annual reports from 2013 to 2021 were analyzed using the material topics from the ESG reports and applying them to the CSV definition and criteria proposed by Menghwar and Daood (2021) to analyze the relationship between CSV and ESG performance.

The main research results show a positive relationship between CSV and ESG performance in the cement industry. The study also found that aligning social problems with the value chain and creating direct economic profit are two important standards for CSV, and they are essential for companies to maintain their commitments to ESG actions.

The contribution of this study is to provide empirical evidence of the positive impact of CSV on ESG performance in the cement industry. The results show that companies can simultaneously address social problems and create economic value, promoting long-term sustainable development. The results of this study also provide insights for policymakers, investors, and managers to encourage the adoption of CSV to generate positive cycles of ESG practice and create value for both society and business.

Chapter II. Literature Review

2.1. Origin of CSR

In 1923, Oliver Sheldon published "The Philosophy of Management," a critical analysis of Taylorism's repeated actions that caused significant harm to workers. Sheldon (1923) argued that companies and enterprises must be held accountable for their actions, thus introducing an early concept of CSR.

The concept of CSR gained recognition in scholarly discourse following the publication of Bowen's seminal work, "Social Responsibilities of the Businessman." Bowen (1953) linked CSR with morality and Protestantism, arguing that businesspersons have an obligation to act responsibly. Bowen (1953) emphasized that CSR is vital for a company's survival.

Bowen's (1953) work inspired subsequent scholars to explore the concept of CSR. However, most of the theories related to CSR focused on external pressures, as noted by Moon and Parc (2019). These studies mostly discussed CSR in terms of philanthropy and reputation. In other words, the purpose of CSR was to pursue self-satisfaction rather than performance orientation.

2.2. Origin of CSV

In recent years, the concept of CSR has evolved from being a mere responsibility to encompass a wider range of fields. Porter and Kramer (2006) identified two types of CSR, namely responsive CSR and strategic CSR. Responsive CSR is similar to the aforementioned CSR theories that mainly focus on external pressure, and companies tend to view it as a cost or constraint. In the words of Porter and Kramer (2006), responsive CSR involves "good citizenship" and "mitigating harm from value chain activity." Despite the seemingly passive and negative nature of responsive CSR, companies still need clear goals and measurement standards to achieve it. To illustrate responsive CSR, Porter and Kramer (2006) used General

Electric (GE)'s donation to schools as an example.

On the contrary, strategic CSR emphasizes the pursuit of both societal and business advantages. According to Porter and Kramer (2006), firms can exploit opportunities from strategic CSR. While responsive CSR aims to reduce the harm caused by supply chain activities to society, strategic CSR is more active and seeks to transform supply chain activities to be beneficial to society while strengthening the company's own strategy. For instance, Marriott provides education and training to the long-term unemployed, which benefits society while allowing Marriott to reduce the cost of recruiting entry-level employees. Porter and Kramer (2006) refer to this type of CSR action, which is based on strategic thinking and benefits both society and the company itself, as Strategic CSR.

Porter and Kramer (2011) expanded their concept of strategic CSR to a broader horizon by clarifying CSR and CSV in three dimensions. Firstly, CSR is primarily driven by external pressures, whereas CSV strives to enhance the core competitiveness of firms. Secondly, the degree of connectivity to business is different for CSR and CSV. If the effort is strongly related to business, it can be classified as CSV. Lastly, CSV creates value for both society and firms, making it a positive-sum game, rather than a zero-sum game.

The concept of CSV has been validated and discussed in numerous literatures. For instance, Hasbu et al. (2022) sought to examine the influence of creating shared value (CSV) on corporate performance. The authors conducted an empirical study by surveying Indonesian listed companies and used regression analysis for data analysis. Their findings indicate that companies implementing CSV perform better in terms of financial performance, customer satisfaction, employee satisfaction, and social responsibility. In particular, CSV companies perform better in terms of social responsibility, indicating that CSV has a positive impact on long-term sustainable development. Moreover, the authors identified three main elements of CSV: value creation, socio-economic development, and environmental protection. They emphasized that CSV is not just about fulfilling CSR or ESG but rather achieving the

common development of businesses and society by integrating social, economic, and environmental goals. Hasbu et al. (2022) supports the concept of CSV and provides empirical evidence to support the positive impact of CSV on corporate performance.

2.3. Improvement and Criticism of CSV Theory

Following the introduction of the CSV framework by Porter and Kramer (2006, 2011), numerous scholars have engaged in discussions building upon their framework. These discussions can be broadly categorized into two main approaches: criticisms of the CSV theory and efforts to enhance the CSV theory.

In the realm of improving the CSV theory, De los Reyes, Scholz, and Smith (2017) proposed the concept of "CSV+" as an improvement to the traditional CSV theory. Their comprehensive literature review highlighted the limitations of conventional CSV, such as its focus on short-term results and the overlooking of power dynamics and broader societal issues. To address these limitations, they introduced CSV+, which integrates not only economic and social aspects but also environmental and ethical dimensions of value creation. In a similar vein, Moon et al. (2011) extended the CSV framework by emphasizing the importance of core competencies and introducing the concept of four types of corporations. This extension provided a more comprehensive understanding of CSV, enabling companies to progress from being Stupid or Selfish to becoming Good or Smart corporations. Furthermore, Moon and Parc (2019) introduced the concept of "Corporate Social Opportunity (CSO)" as an extension to the CSV framework. CSO proactively identifies and pursues new business opportunities that address societal needs and create shared value, going beyond traditional CSR. Collectively, these scholars' contributions serve as significant supplements to the CSV theory, expanding our understanding of CSV and offering alternative perspectives on corporate value creation.

While the theory of CSV has undergone continuous improvement, there is also a group

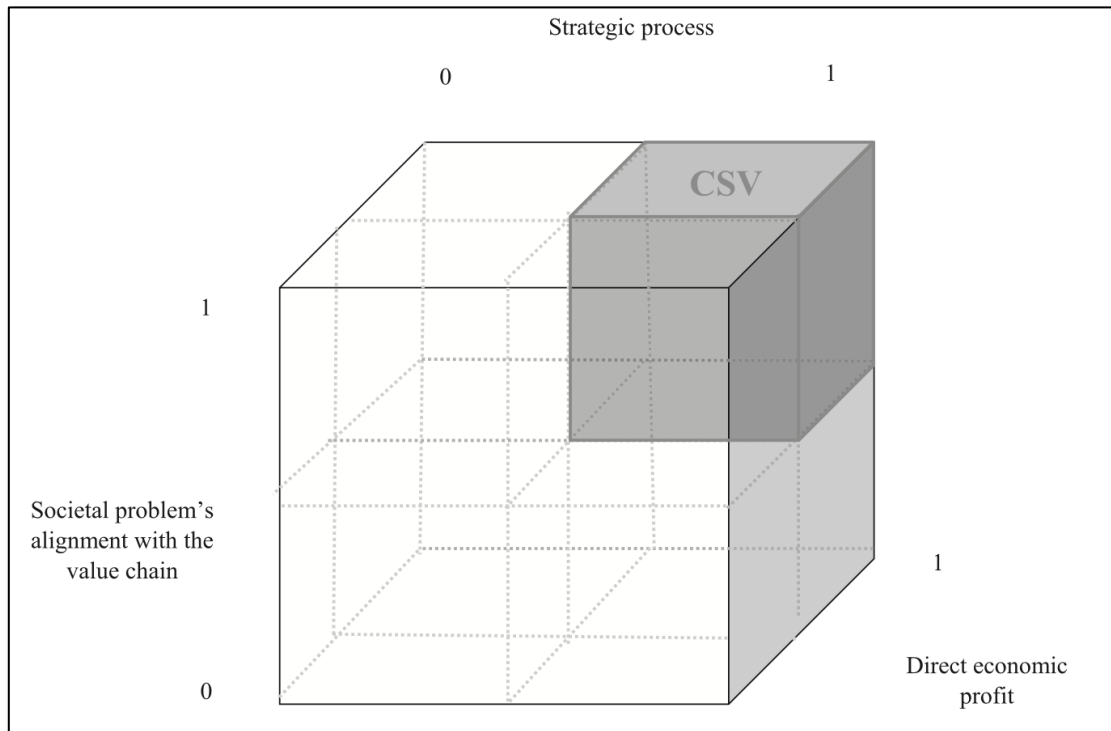
of scholars who perceive CSV as nothing more than a buzzword rather than a theory with a solid foundation. Criticism of the concept of CSV has been raised in several articles, shedding light on its limitations and lack of empirical evidence. Crane et al. (2014) critically examined CSV and highlighted issues such as the lack of clarity in its definition, insufficient empirical support, and the potential for CSV to be used to rationalize existing practices rather than driving authentic societal change. Beschorner (2014) argued that CSV is a one-dimensional approach that fails to capture the complexity of social issues and proposed complementing it with other perspectives. Dembek et al. (2016) found confusion and ambiguity surrounding the shared value concept, calling for greater clarity and precision in its definition. De los Reyes and Scholz (2019) acknowledged potential benefits of CSV but raised concerns about its focus on economic outcomes and questioned its ability to effectively address social and environmental concerns. These articles collectively criticize the academic value of CSV, emphasizing the need for empirical research and a more comprehensive approach to corporate sustainability.

After undergoing various improvements and challenges by scholars, the concept of CSV proposed by Porter and Kramer (2011) has been subject to a systematic literature review conducted by Menghwar and Daood (2021). Menghwar and Daood (2021) conducted a comprehensive literature review encompassing all available articles pertaining to CSV. They found that "the existing body of literature on CSV is characterized by ambiguity, limited theoretical underpinnings, and inconsistencies," indicating a need for clear integration and definition. They reviewed 242 articles published from 2010 to 2020 and identified three main findings. Firstly, the notion of CSV represents an evolutionary contribution to the prevailing academic discourse, rather than a groundbreaking concept or trendy terminology. Secondly, given the rationality of companies, their choice to embrace the CSV approach is contingent upon considerations of opportunity and transaction costs. Thirdly, the implementation of a CSV strategy is contingent upon various external and internal factors, making it challenging

to adopt a universal approach.

Menghwar and Daood (2021) also proposed their own definition of CSV during their exploration of CSV-related processes, which consists of three elements: Strategic Process, Societal Problem's Alignment with the Value Chain, and Direct Economic Profit. They used a cube showed in **Figure 1** to describe the relationship between these three indicators, and only when a company's behavior meets the requirements of all three criteria simultaneously can it be considered as CSV. The three criteria proposed by Menghwar and Daood (2021) are described in detail as follows:

Figure 1. Characteristics of CSV Proposed by Menghwar and Daood (2021)



Strategic Process: The first criterion proposed by Menghwar and Daood (2021) for evaluating CSV is the strategic process. This criterion measures whether a company has a clear plan or strategy in place to execute CSV initiatives. If a company has a clear plan and regularly evaluates and updates it to ensure its alignment with the company's strategy and goals, it can be considered to meet this criterion.

Societal Problem's Alignment with the Value Chain: The second criterion proposed by

Menghwar and Daood (2021) for evaluating CSV is the alignment of societal problems with the value chain. This criterion measures whether the societal problems that a company addresses through its CSV initiatives are intricately connected to its fundamental value chain. If a company's CSV initiatives are related to its core business and have a significant social impact, it can be considered to meet this criterion.

Direct Economic Profit: The third criterion proposed by Menghwar and Daood (2021) for evaluating CSV is direct economic profit. This criterion measures the economic impact of CSV initiatives on a company. If a company's CSV initiatives directly contribute to economic benefits such as cost savings, productivity improvement, and increased sales, it can be considered to meet this criterion.

The main contribution of Menghwar and Daood's (2021) literature is to confirm that while CSV is not revolutionary, it has a contribution to the existing ESG-related literature. Furthermore, Menghwar and Daood (2021) highlight that the decision of companies to adopt CSV strategies is contingent upon the consideration of opportunity costs and transaction costs, and is influenced by various internal and external factors that encourage the implementation of CSV. Although not their primary objective, Menghwar and Daood (2021) propose a definition for CSV, which this study will use in the comparative research of TCC Group and ACC Group.

However, some scholars have already conducted case studies from the perspective of CSV. This study will first review the contributions of these articles and explain the research's point of entry and the further contributions that this research can make.

2.4. Case study with CSV view

This study aims to conduct a case study from the perspective of CSV, therefore a review of relevant academic literature is necessary. The case studies related to CSV are divided into "non-Taiwanese companies" and "Taiwanese companies" for the purpose of review and

discussion in this study. The literature review and analysis will examine and compare case studies from both categories, providing insights into the application and outcomes of CSV in different contexts.

The articles reviewed examine the concept of CSV through case studies conducted outside of Taiwan. Nandi et al. (2020) explore the relationship between CSV and business model success or failure in Africa, proposing a framework for applying CSV and providing recommendations for implementation. Lim and Lee (2022) analyze how Yuhan-Kimberly, a South Korean company, addressed a societal issue through CSV, emphasizing the role of mutually beneficial relationships. Khurshid and Snell (2022) investigate the distinctions and relationships between CSV and CSR in Asia-based firms, highlighting the strategic nature of CSV. De Tommaso and Pinsky (2022) examine the implementation of CSV at Suzano, a Brazilian company, showcasing the generation of economic, social, and environmental value. Although each study focuses on different contexts, they collectively contribute to understanding the potential and challenges of implementing CSV to create shared value.

In addition to case studies conducted on companies worldwide from the perspective of CSV, there are also articles that examine case studies on companies in Taiwan. Hsiao and Chuang (2016) focus on a case study of implementing green practices in star hotels in Taiwan, using CSV as a framework. Their research combines literature review, in-depth interviews, and on-site observations to investigate the implementation of environmentally sustainable practices in the hospitality sector. Hsiao and Chuang (2016) argue that CSV can help balance business interests and societal welfare, creating shared value for the hotel industry and the environment. They support the concept of CSV and suggest its usefulness in implementing green practices, while acknowledging challenges in measuring the social and environmental impacts of such practices. Wu, Wu, and Wu (2018) examine the growth and obstacles faced by social enterprises in Taiwan, with a focus on their contribution to community development. They adopt a qualitative approach, conducting comprehensive

interviews with influential figures in the social enterprise sector to gather valuable insights. Wu et al. (2018) shed light on the obstacles faced by social enterprises in Taiwan, such as limited resources, government policies and regulations, and societal perceptions. They emphasize the potential of social enterprises in contributing to community development and advocate for government support and the development of sustainable business models that integrate social and financial objectives.

In summary, existing academic research on CSV is abundant for companies outside Taiwan, but limited to the hospitality industry and social enterprises within Taiwan. Furthermore, there is a lack of case studies from a CSV perspective in highly polluting industries, such as the cement industry. This research gap indicates a need for further investigation into Taiwanese companies and the cement industry from a CSV perspective.

However, before delving into the study of the cement industry from a CSV perspective, it is important to review existing literature that explores the industry from an ESG perspective. This study acknowledges that CSV is one of the mechanisms that can influence ESG outcomes, and thus a literature review of relevant ESG research on the cement industry will be conducted in the next section. This review aims to examine the current achievements in the academic community regarding this research area and identify areas where this study can contribute.

2.5. Relevant ESG research on the cement industry

Benhelal, Shamsaei, and Rashid (2021) is a review of the challenges faced in the implementation of strategies to reduce CO₂ emissions in the cement industry. Benhelal et al. (2021) examine the current strategies employed in the industry and evaluate their effectiveness in reducing CO₂ emissions. Benhelal et al. (2021) method used is a comprehensive literature review on the reduction of CO₂ emissions in the cement industry. Benhelal et al. (2021) identify the main challenges facing the industry, including the high cost

of implementing new technologies, the lack of incentives for reducing emissions, and the lack of regulatory frameworks for enforcing emissions reductions. Benhelal et al. (2021) also discuss the potential solutions to these challenges, such as increasing public awareness of the need for sustainable practices, providing financial incentives for companies to invest in emissions reductions, and developing regulatory frameworks that encourage companies to reduce their emissions. Benhelal et al. (2021) provides a valuable contribution to the ESG literature by highlighting the challenges faced by the cement industry in reducing its carbon footprint and suggesting potential solutions to these challenges.

Barker, Ingersoll, and Teal (2013) explore the challenges and limitations of the integration of employees in CSR initiatives within the cement industry. Barker et al. (2013) is based on qualitative research methods, including in-depth interviews and analysis of company documents. Barker et al. (2013) argue that while employee participation in CSR can have positive outcomes, there are limits to the inclusivity of such initiatives, particularly in relation to the power dynamics between management and employees. Barker et al. (2013) suggest that the inclusion of employees in CSR initiatives needs to be based on mutual benefit, and that there needs to be greater consideration of employee perspectives in the design and implementation of such initiatives. Barker et al. (2013) makes a contribution to the ESG-related theory by highlighting the importance of employee integration in CSR and the need for a more participatory approach to CSR in the cement industry.

Rustinsyah (2016) investigates the influence of CSR programs implemented by a cement company on the livelihoods of a rural community in Tuban, East Java, Indonesia. Using a case study approach, Rustinsyah (2016) analyzes the impacts of the company's CSR initiatives on multiple dimensions of the community's well-being, such as education, health, and environmental awareness. The research method employed in Rustinsyah (2016) includes in-depth interviews, focus group discussions, and observations. Rustinsyah (2016) found that the CSR programmes had a positive impact on the community's lifestyles, particularly in

improving education and environmental awareness. However, Rustinsyah (2016) notes that there are limitations to the company's CSR programmes and suggests that a more comprehensive and sustainable approach is necessary to achieve long-term benefits for the community. Rustinsyah (2016) contributes to ESG-related theory by highlighting the importance of community engagement and participation in CSR programmes to ensure their effectiveness and sustainability.

Adewuyi and Olowookere (2010) examines the relationship between CSR and sustainable community development, using WAPCO, a Nigerian cement company, as a case study. Adewuyi and Olowookere (2010) argue that CSR can contribute to sustainable development by addressing the social, economic, and environmental concerns of communities. Adewuyi and Olowookere (2010) is based on qualitative research methods, including interviews, observations, and document analysis. Adewuyi and Olowookere (2010) find that WAPCO's CSR initiatives have had a positive impact on the surrounding communities, including job creation, improved infrastructure, and environmental conservation. Adewuyi and Olowookere (2010) contributes to ESG theory by emphasizing the importance of CSR in promoting sustainable development and highlighting the role of private sector in addressing social and environmental challenges in developing countries.

In conclusion, these articles provide valuable insights into the challenges and opportunities of ESG practices in the cement industry. While the selected articles represent a fraction of the vast ESG-related literature on the cement industry, they offer valuable perspectives on CO2 abatement, employee integration, CSR programmes, and sustainable community development. However, the research in this area has been limited in terms of studying the cement industry from a CSV perspective, let alone the Taiwanese cement industry. Future studies should consider the CSV framework to explore how the cement industry can balance social, environmental, and economic considerations. Additionally, future research could focus on the effectiveness and sustainability of ESG initiatives in the

Taiwanese cement industry, where significant progress in ESG practices could be achieved with the proper regulatory framework, incentives, and community engagement. This allows this study to study Taiwan's cement industry from the perspective of CSV, and to make up for the deficiencies in the literature in this area.

2.6 Mainstream of ESG-related Research

In recent years, ESG issues have received increasing attention and are considered closely related to corporate financial performance. This study selected three highly cited articles to explore the mainstream direction of ESG research: the relationship between ESG and financial performance, the relationship between ESG and corporate value, and the utility of ESG in helping companies navigate crises.

Friede, Busch and Bassen (2015) concluded that there is a positive relationship between ESG and corporate financial performance after a comprehensive analysis of over 2,000 empirical studies using quantitative Meta-analysis methods. The results showed that ESG indicators have a general and stable impact on corporate financial performance, indicating that ESG management can create better financial results for companies.

Fatemi, Glaum and Kaiser (2018) investigated the impact of ESG performance on corporate value and believed that transparency is the moderating factor in the relationship between ESG performance and corporate value. Using data from German companies and regression analysis, Fatemi et al. (2018) found that ESG performance has a positive impact on corporate value but only when companies disclose their ESG-related information.

Broadstock, Chan, Cheng and Wang (2021) studied the impact of ESG performance on corporate performance during the pandemic. Using COVID-19 in China as an example, Broadstock et al. (2021) found a positive impact of ESG performance on corporate performance during crises by analyzing the relationship between corporate ESG scores and the impact of COVID-19 on corporate performance. This suggests that good ESG

performance helps companies respond to crises and risks.

In summary, current ESG research focuses primarily on three directions: exploring the relationship between ESG performance and financial performance, investigating the link between ESG performance and corporate value, and exploring the role of ESG performance during crises. However, most existing research treats ESG performance as an independent variable or explores the interrelationships between ESG performance and other factors, but rarely considers ESG performance as a dependent variable to investigate the factors that influence it. Therefore, this study hopes to fill the academic gap in this area by exploring the factors that may affect ESG as a basis for companies to implement ESG.

Chapter III. Research Problem, Objectives, and Expected Contributions

From the literature review, it can be observed that there is a lack of research in the academic community that analyzes the cement industry using the concept of CSV, as well as a lack of research on Taiwanese companies using CSV as a starting point. The cement industry is a highly energy-intensive and polluting industry, and improving its Environmental, Social, and Governance (ESG) practices can contribute to overall societal progress (Benhelal et al. 2021). Therefore, the main objective of this study is to fill this gap in the literature. To achieve this objective, this study intends to conduct a comparative analysis of two companies, Taiwan Cement Corporation (TCC) and Asia Cement Corporation (ACC), to examine whether there are differences in their achievements in CSV, and how these differences affect the two companies.

Apart from the limitations of the research scope, CSV itself is still a concept that requires verification. While there are many discussions on the concept and definition of CSV, empirical research can make the concept of CSV more robust or find directions for improvement. For example, although Menghwar and Daood (2021) proposed new criteria for the concept of CSV, there is still a lack of relevant empirical research. This study hopes to contribute to this aspect.

In addition, current research on ESG mainly focuses on the relationship between ESG and financial performance, or the relationship between ESG and firm value, as well as the use of ESG as a means for companies to overcome crises. In other words, most studies to date have examined ESG as a dependent variable, or discussed the interactive relationship between ESG and other factors, with little exploration of the question "what factors influence ESG".

Finally, this study also aims to clarify the role of CSV in companies and serve as a guide for companies to implement ESG practices. Companies can adopt a CSV perspective in their

approach to ESG, which can provide direction and create a win-win situation for both society and the company. There are still many companies that view ESG as a cost and are reluctant to implement it, or only comply with legal requirements because of regulatory punishments. If the role of CSV in companies can be proven, it may provide new ways of thinking about ESG to companies.

To achieve the above objectives and expected contributions, this study will investigate the following hypotheses and questions:

- (a.) Companies with similar business bases and levels of business performance should have similar ESG performance.
- (b.) If two companies with similar business bases and levels of business performance do not have similar ESG performance, CSV may be one of the key influencing mechanisms.

In the next chapter, which is the research methodology section, this study will describe how "Companies with similar business bases and levels of business performance", "ESG performance," and "CSV" are defined.

3.1. Research Methodology

The methodology section will be organized into three main parts: Variables and Hypotheses, Data Collection, and Data Analysis Methods. The Variables and Hypotheses section will define the key variables and develop research hypotheses. The Data Collection section will describe the research design, sampling methods, data collection instruments, and procedures used to collect data. The Data Analysis Methods section will describe the statistical techniques used to analyze the data collected.

In this section, this study will take a closer look at the variables involved in this study and the hypotheses to be tested and will define each variable, including its operational definition and measurement method, and describe how these variables are expected to relate to each

other based on our hypotheses. By carefully defining variables and hypotheses, this study can ensure that this research is well-structured and rigorously designed, allowing this study to draw meaningful conclusions from the data.

3.1.1. Hypothesis 1: There is a significant difference in ESG performance among firms with similar business bases and levels of business performance.

The dependent variable in this hypothesis is the ESG performance of the companies being studied. This variable is expected to vary based on the independent variable, which is the business bases and levels of business performance between the companies. By examining the relationship between these two variables, this study aims to determine whether or not companies that are similar in certain ways are also likely to have similar ESG performance. This hypothesis is an important starting point for investigation into the mechanism that influence ESG performance, and will guide the analysis of the data this study collect.

A. Independent variable: “The business bases and levels of business performance between the companies”

When evaluating the similarity between two companies, this study chose several criteria that can be used. Three possible criteria include similar industry and business base, revenue highly correlated, and similar return on equity (ROE) and return on assets (ROA).

(a.) Similar industry and business base:

Firstly, companies in the same industry and with similar business bases are likely to have similar customers, suppliers, and market competition. This similarity can indicate a shared set of challenges and opportunities for the companies. This criterion can be used to evaluate the degree of similarity between companies because companies in the same industry are subject to similar external factors that can affect their performance.

(b.) Revenue highly correlated:

Secondly, revenue highly correlated companies have a strong relationship in terms of their sales performance. Companies with high revenue correlation are likely to have a similar

customer base and target market. This criterion can be used to evaluate the degree of similarity between companies because it can show that they are operating in a similar market environment and have similar business models.

(c.) Similar ROE and ROA :

Finally, companies with similar ROE and ROA have similar levels of efficiency and profitability. ROE and ROA are commonly used to measure a company's profitability and efficiency, respectively. This criterion can be used to evaluate the degree of similarity between companies because it shows that they have similar levels of performance and efficiency.

The order of these criteria is logical because a company's industry and business base can influence its revenue, and a company's revenue is closely linked to its ROE and ROA. Therefore, evaluating similarity based on these three criteria in this order can provide a comprehensive assessment of the degree of similarity between two companies.

In conclusion, when evaluating the degree of similarity between two companies, their similarity in industry and business base, correlation of revenue, ROE and ROA can be considered. These criteria can be used to evaluate the level of similarity between companies because they reflect similar external factors, market environments, and performance levels.

B. Dependent variable: "ESG performance"

The dependent variable of this study is "ESG performance," and the relevant data will be collected from the "Company Investor Relations Integration Platform" provided by the Taiwan Depository & Clearing Corporation (TDCC). The platform offers six commonly used ESG ratings, including Sustainalytics ESG scores, MSCI ESG ratings, FTSE Russell ESG ratings, ISS ESG ratings, S&P Global ESG ratings, and Moody's ESG scores. The TDCC is a licensed securities central depository and short-term commercial paper central depository and settlement institution under the supervision of the Financial Supervisory Commission of the Taiwan. It is also the only back-end institution in Taiwan's financial market. The TDCC has a

significant position in Taiwan's securities trading market, and many traders and government agencies rely on the information provided by the TDCC. Therefore, this study uses this platform to collect ESG-related data..

ESG performance refers to a company's overall ability to manage environmental, social, and governance risks and opportunities. It reflects a company's commitment to sustainable and responsible business practices, which can contribute to long-term financial performance and stakeholder value. ESG ratings are used by investors, analysts, and other stakeholders to evaluate a company's ESG performance, and they are often considered a proxy for a company's sustainability and resilience.

Sustainalytics ESG Risk Ratings is one of the most widely used ESG ratings, covering more than 16,000 companies globally (Sustainalytics, 2023). The rating assesses a company's exposure to ESG risks and opportunities based on more than 200 ESG indicators (Sustainalytics, 2023). Sustainalytics uses a proprietary methodology that integrates both qualitative and quantitative analysis, as well as industry-specific criteria, to provide a comprehensive assessment of a company's ESG performance (Sustainalytics, 2023).

MSCI ESG Ratings is another popular ESG rating, covering more than 8,500 companies globally (MSCI ESG Ratings, 2023). MSCI assesses a company's ESG performance based on more than 1,000 ESG indicators across 37 ESG themes, which are grouped into four categories: governance, social, environmental, and industry-specific (MSCI ESG Ratings, 2023). MSCI uses a rules-based methodology that combines both quantitative and qualitative analysis, as well as external data sources, to provide a robust assessment of a company's ESG performance (MSCI ESG Ratings, 2023).

FTSE Russell ESG ratings is a widely-used ESG rating system that is used by investors, institutions, and funds around the world and holds an important position in the financial market (FTSE Russell ESG ratings, 2023). For example, FTSE Russell ESG ratings are recognized by European stock exchange markets, the United Nations Principles for

Responsible Investment, and other institutions (FTSE Russell ESG ratings, 2023). According to FTSE Russell's report, as of 2021, over 2,100 institutions worldwide have used its ESG rating system. Moreover, an increasing number of investors are realizing the importance of ESG factors to long-term investment value, making the use of ESG rating systems an important reference for evaluating investment value (FTSE Russell ESG ratings, 2023). As a result, FTSE Russell ESG ratings have received widespread attention.

ISS ESG ratings are provided by ISS ESG, one of the world's largest providers of corporate governance, environmental, and social information and research services (ISS ESG, 2023). The ratings are based on a wealth of data and indicators, including but not limited to corporate governance, environmental, social, and ethical performance (ISS ESG, 2023). By assessing these areas, ISS ESG ratings aim to measure a company's overall ESG performance (ISS ESG, 2023). The importance of ISS ESG ratings lies in their use by many important academic and financial institutions, including the United Nations, European securities market exchanges, the Principles for Responsible Investment, and others (ISS ESG, 2023). In addition, an increasing number of investors recognize the importance of ESG factors for long-term investment value, making the use of ESG rating systems an important reference for evaluating investment value (ISS ESG, 2023). As a result, ISS ESG ratings have become an important tool for assessing corporate sustainability performance, and their ratings are widely recognized and cited.

S&P Global ESG Scores cover more than 20,000 companies globally and assess a company's ESG performance based on more than 150 ESG indicators (S&P Global ESG Scores, 2023). The rating uses a combination of company-reported data, public data sources, and third-party data providers to evaluate a company's ESG performance (S&P Global ESG Scores, 2023). S&P Global assesses a company's ESG performance across three dimensions: environmental, social, and governance, and provides an overall ESG score that ranges from 0 to 100 (S&P Global ESG Scores, 2023).

Moody's ESG Ratings assess a company's exposure to ESG risks and opportunities based on more than 120 ESG indicators across 10 broad themes, including governance, social, and environmental factors (Moody's ESG Ratings, 2023). Moody's uses a quantitative and qualitative approach that combines company-reported data, news and media coverage, and other external sources to provide a comprehensive assessment of a company's ESG performance (Moody's ESG Ratings, 2023). The rating covers more than 11,000 companies globally (Moody's ESG Ratings, 2023).

The selection of these six ESG rating systems was based not only on their availability through the TDCC, but also on their wide coverage of companies across different industries and regions, their robust methodology, and their reputation and recognition in the ESG investing community. By using multiple ESG ratings, this study aims to provide a more comprehensive and diversified assessment of companies' ESG performance and to reduce the impact of any one rating system's biases or limitations.

3.1.2. Hypothesis 2: If two companies with similar business bases and levels of business performance do not have similar ESG performance, CSV may be one of the key influencing mechanisms.

This study aims to investigate the potential impact of CSV on the ESG performance of similar companies. However, as mentioned in the literature review section, the discussion of CSV is still very active. There are also many academic papers where many scholars try to criticize CSV and try to improve CSV. Here, this study chooses the definition of CSV by Menghwar and Daood (2021) as the basis of this study. The term CSV will be further defined in the following paragraphs.

Menghwar and Daood (2021) provide a comprehensive definition of CSV and propose three criteria for evaluating a company's CSV initiatives. The importance of Menghwar and Daood (2021) lies in its contribution to the development of a clear and widely accepted definition of CSV. This study adopts the definition and criteria proposed by Menghwar and

Daood (2021) for evaluating the impact of CSV on the ESG performance of companies with similar business bases and levels of business performance.

A. Strategic Process:

The first criterion proposed by Menghwar and Daood (2021) for evaluating CSV is the strategic process. This criterion measures whether a company has a clear plan or strategy in place to execute CSV initiatives. If a company has a clear plan and regularly evaluates and updates it to ensure its alignment with the company's strategy and goals, it can be considered to meet this criterion.

B. Societal Problem's Alignment with the Value Chain:

The second criterion proposed by Menghwar and Daood (2021) for evaluating CSV is the alignment of societal problems with the value chain. This criterion measures whether the societal problems that a company addresses through its CSV initiatives are intricately connected to its fundamental value chain. If a company's CSV initiatives are related to its core business and have a significant social impact, it can be considered to meet this criterion.

C. Direct Economic Profit:

The third criterion proposed by Menghwar and Daood (2021) for evaluating CSV is direct economic profit. This criterion measures the economic impact of CSV initiatives on a company. If a company's CSV initiatives directly contribute to economic benefits such as cost savings, productivity improvement, and increased sales, it can be considered to meet this criterion.

In summary, this study adopts the definition and criteria proposed by Menghwar and Daood (2021) to evaluate the impact of CSV on the ESG performance of two companies with similar business bases and levels of business performance. The three criteria are the strategic process, alignment of societal problems with the value chain, and direct economic profit. The

subsequent section will outline the research methodology and data collection techniques employed in this study.

3.2. Data Collection

The research design, including the formulation of hypotheses and definition of variables, was presented in detail in the previous section. This section will now focus on the process of data collection to validate the hypotheses and operationalize the variables. Specifically, the chapter will provide a comprehensive description of the data sources used, including the independent and dependent variables, as well as other relevant sources, to give readers a complete understanding of the data collection process.

One of the independent variable in this study is "the business bases and levels of business performance between the companies," and the relevant data will be collected from the financial reports, company websites, and other publicly available information of TCC Group and ACC Group, including industry and business bases, revenue, ROE, ROA, and other indicators. These data will provide the basis for evaluating the degree of similarity between the two companies.

This study will utilize the sustainability reports (or ESG reports) of TCC and ACC to determine whether the ESG practices of these two companies qualify as CSV. Sustainability report is a comprehensive report on a company's economic, environmental, and social development. Currently, the Financial Supervisory Commission (FSC) requires all listed and OTC companies with a paid-in capital of NT\$2 billion or more to prepare and file sustainability reports starting in 2023 (FSC Taiwan, 2023). Therefore, sustainability report has become an important tool for evaluating a company's performance in sustainable development. This study will use sustainability reports as the source of ESG indicators to enable cross-company comparisons between TCC and ACC in their ESG performance. As the two largest cement companies in Taiwan, TCC Group and ACC Group have started issuing

ESG reports for a long time. Currently, ESG reports from 2010 to 2021 can be collected on the official website of TCC Group, while ACC Group's official website provides access to ESG reports from 2013 to 2021. The availability of these public data enables this study to evaluate the ESG actions of these two companies more conveniently. In addition, the ESG reports issued by these two companies have been subject to either auditor's assurance or third-party verification, which increases the credibility of the ESG reports.

This study has provided a detailed account of the data collection process, including the sources used to verify the hypotheses and define and quantify the variables. The data collected for this study has been sourced from verified public information, such as financial statements and annual reports that have been certified by accountants, as well as widely-used rating systems that have solid theoretical foundations, such as the six commonly-used ESG ratings provided by the TDCC: Sustainalytics ESG score, MSCI ESG rating, FTSE Russell ESG rating, ISS ESG rating, S&P Global ESG rating, and Moody's ESG score. This study aims to reduce selection bias and increase its credibility and effectiveness by using such public information.

3.3. Data Analysis Methods

3.3.1. Hypothesis 1: There is a significant difference in ESG performance among firms with similar business bases and levels of business performance.

In Hypothesis 1, the dependent variable "ESG performance" and the independent variable "The business bases and levels of business performance between the companies" have been defined and operationalized.

Regarding the "The business bases and levels of business performance between the companies," the "Similar industry and business base" aspect will be compared using qualitative research methods such as company websites and annual reports. On the other hand, the "Revenue highly correlated" and "Similar ROE and ROA" aspects will be analyzed

using data provided in the annual reports. This study expects to assess this variable through these three indicators, which are the independent variable in Hypothesis 1.

As for the dependent variable "ESG performance," as previously mentioned in this study, there are six quantitative indicators that can be used to assess the ESG performance of the two companies. Since these six indicators are widely used internationally and are also used by TDCC to evaluate ESG performance, this study will directly use these six ratings or rankings to evaluate the ESG performance of TCC Group and ACC Group.

3.3.2. Hypothesis 2: If two companies with similar business bases and levels of business performance do not have similar ESG performance, CSV may be one of the key influencing mechanisms.

Analyzing CSV in Hypothesis 2 is expected to be a major challenge. Menghwar and Daood (2021) proposed three criteria for assessing CSV, namely "Strategic Process", "Societal Problem's Alignment with the Value Chain", and "Direct Economic Profit". However, there is still a need for this study to define a systematic approach for assessing a company's actions against these three criteria.

As mentioned in the previous paragraph, the FSC in Taiwan requires companies with a paid-in capital of more than NTD 2 billion to publish an annual sustainability report. Additionally, the Taiwan Stock Exchange has issued "Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies" to mandate the preparation and publication of sustainability reports for listed companies of a certain size (TWSE, 2022). Since both TCC Group and ACC Group meet the requirement of publishing sustainability reports, this study was able to easily obtain and compare the sustainability reports of these two companies.

However, both TCC Group and ACC Group view sustainability reports not only as a legal requirement but also as a tool for promotion and strategy. Therefore, both companies' sustainability reports are well-designed with a lot of sensory language and presented in a very

elaborate way. In addition, the weight of the two companies' sustainability reports is significant, with TCC Group's report for 2021 totaling 127 pages. If the sustainability actions of both companies since 2010 were to be analyzed, there would be more than 2000 pages of data to be processed, which poses a significant challenge for this study to systematically compare the sustainability actions of both companies.

According to the "Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies," listed companies are required to prepare sustainability reports in accordance with the Global Reporting Initiatives (GRI) Standards (TWSE, 2022). According to the GRI website, the Standards enable organizations of any size to report their impacts on the economy, environment, and people in a comparable and credible way, increasing transparency on their contribution to sustainable development. TCC Group and ACC Group have already compiled their sustainability reports in accordance with GRI Standards, and by following the key points listed in the GRI Standards, their ESG-related actions can be systematically compared.

However, there are still some drawbacks to the GRI Standards. Firstly, there are over 100 indicators that companies need to respond to, which can cause the research to lose focus if the Standards are used. Secondly, not all of the indicators in the GRI Standards are relevant to this study's needs. This study aims to evaluate a company's ESG actions based on the three criteria for CSV proposed by Menghwar and Daood (2021), but some of the indicators in the GRI Standards may not meet this requirement. For example, while disclosures such as "Nomination and selection of the highest governance body" and "Remuneration policies" are important indicators for evaluating a company's ESG actions, they may not be relevant to the three criteria for CSV.

Although this study could simply select the relevant indicators from the GRI Standards, doing so may create selection bias. In other words, if this study arbitrarily selects indicators to evaluate whether a company's actions meet CSV or not, it may intentionally or

unintentionally select or exclude specific indicators, resulting in research results that are influenced by human factors. Therefore, to avoid such influence, this study needs a fair and verifiable research method. The next section will explain how this study selects specific topics using "material topics" and systematically analyzes the two companies while eliminating the researcher's personal will.

3.3.3. Material Topics

Material topics, also known as materiality, is an approach to assessing sustainable issues in ESG reports from both the organizational and stakeholder viewpoints. According to the third clause of "Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies," the company should disclose its identified material economic, environmental, and social topics, management approach, topic-specific disclosure, and its reporting requirements, which shall at a minimum meet the core option of the GRI Standards (TWSE, 2022). This study will use the term "material topics" uniformly to avoid any ambiguity, except for literature review or citing others' articles.

Calabrese et al. (2019) explored the application of materiality analysis in sustainability reporting. In Calabrese et al. (2019), materiality is defined as the issues or risks that companies face in the economic, environmental, and social domains, which may have significant impacts on their business, stakeholders, and society. Calabrese et al. (2019) employed a structured approach to integrate the GRI materiality matrix and a novel adequacy matrix to present an operational and systematic approach for conducting materiality analysis. The GRI materiality matrix prioritizes sustainability issues based on their significance to both organizations and stakeholders, while the adequacy matrix assists organizations in assessing the transparency and efficacy of their sustainability communication efforts. Moreover, Calabrese et al. (2019) presents a case study to demonstrate the effectiveness of materiality analysis in practical applications.

Although the purpose of Calabrese et al. (2019) is to propose the adequacy matrix, it

provides a clear understanding of the definition and importance of materiality analysis. This study did not use the adequacy matrix to analyze the sustainability reports of TCC Group and ACC Group, as their reports were prepared based on "material topics" mentioned in "Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies", rather than the adequacy matrix. However, this study still determined from Calabrese et al. (2019) that material topics is a suitable research method for case studies.

Geldres-Weiss et al. (2021) endeavors to examine the utilization of the materiality matrix in facilitating the transformation of a company's sustainable business model. Firstly, Geldres-Weiss et al. (2021) provides a conceptualization of the materiality matrix as a strategic tool employed by companies to gain insights into stakeholders' perceptions of significant environmental, social, and economic/governance issues. It allows firms to shape their strategic business model elements, create value, and generate positive outcomes across the triple bottom line for stakeholders. Secondly, Geldres-Weiss et al. (2021) suggests employing the materiality matrix as a resource for internal and external stakeholders to facilitate the transition from conventional business models to sustainable ones and identify the most suitable sustainable business model archetype. Finally, Geldres-Weiss et al. (2021) provides a case study of the “Viña Concha y Toro” business model to demonstrate the materiality matrix's potential in enhancing and transforming a firm's business model towards sustainability.

Geldres-Weiss et al. (2021) lays a solid foundation for this study by using the materiality matrix in a case study and suggests that material topics could be used to complete the relevant CSV research by TCC Group and ACC Group.

3.4. Material Topics in ESG reports of TCC Group and ACC Group

After deciding to analyze the ESG reports of TCC Group and ACC Group through the lens of material topics, this chapter will further explore the material topics presented in these

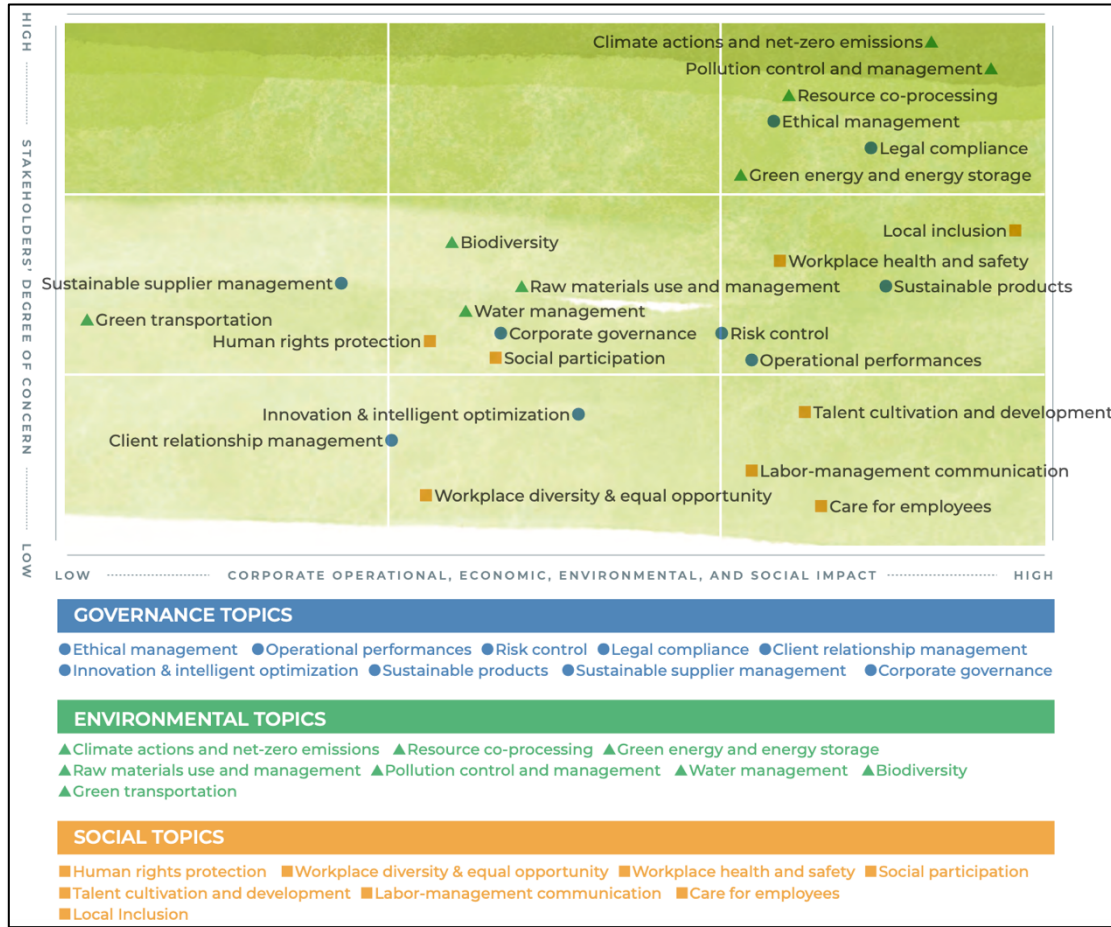
reports.

First, although TCC Group has been publishing ESG reports since 2010, Material topics were only disclosed in their reports starting from 2014. Therefore, the research scope for TCC Group is limited to their ESG reports from 2014 to 2021. On the other hand, ACC Group has been publicly disclosing their ESG reports since 2013, so this study will include their reports from 2013 to 2021 as the research subject.

Secondly, this paragraph will explain how material topics were determined. Although there are slight differences between the two companies, both follow the same method to analyze material topics, which involves:

- A. Identifying stakeholders: using five principles, including responsibility, influence, tension, diverse perspectives, and dependency, to determine stakeholders who will have an impact on the company and interact with it.
- B. Confirming the weight of stakeholders: the company distributes questionnaires to all potential stakeholders, and the company's leadership analyzes the responses and determines the ranking of stakeholders. For example, TCC Group defines the ordering of stakeholder significance as follows: (1) government agencies, (2) clients, (3) employees, (4) local communities, (5) shareholders/investors, and so on.
- C. Y axis- Stakeholders' degree of concern: Use questionnaires to ask stakeholders for their views on material issues, and sort them on the Y axis. This study takes the matrix of material topics in TCC Group's 2021 ESG report as an example. As shown in **figure 2**, the farther away from the origin on the Y-axis, the higher the stakeholder's attention to the material topic.
- D. X axis- Corporate operational, economic, environmental, and social impact: The impact of each issue on the company is evaluated internally by the company and arranged on the X-axis. As shown in **figure 2**, the more right the position on the X-axis, the higher the impact of the material topic on the company.

Figure 2. Matrix of Material Topics of TCC Group (TCC Group, 2022b)



According to the above process, the two companies can determine the issues that stakeholders are concerned about and respond to these issues in their ESG reports. It can be observed from the way material topics are generated that they are not decided by this study, company executives, or any single stakeholder. Rather, they are determined through repeated interactions and conflicts of interest. This ensures that the company can respond to the expectations of society in a more fair, impartial, and transparent way, and that the topics selected by this study will not be subject to selection bias.

3.5. Material Topics of TCC Group focused in this study

Next, this section will present the material topics mentioned in the research targets (i.e., the ESG reports of TCC Group from 2014 to 2021 and ACC Group from 2013 to 2021) in a

table and define the material topics that this study focuses on.

First, the material topics of TCC Group are presented. According to the following table, this study will focus on 14 topics, including: (1) Circular Economy, (2) Climate Actions, Sustainable Strategies and Emissions Reduction, (3) Pollution Control and Management, (4) Biodiversity and Environmental Protection, (5) Human Resources, Workplace Health and Safety, (6) Community, (7) Corporate Governance and Ethical Management, (8) Operational Performance, (9) Risk Management, (10) Legal Compliance, (11) Information Disclosure and Transparency, (12) Product Quality and Product Risk, (13) Service and Customer Satisfaction, and (14) Supplier Management.

It is necessary to explain how this study merged material topics from different years into one topic. **Table 1** explains how TCC Group's 14 topics were generated, and **figure 3** shows the graph of material topics of TCC Group from 2014 to 2021. While this section will not discuss the content of each topic, it will be reserved for the results chapter when discussing CSV criteria in detail.

Table 1. 14 Material Topics of TCC Group

No.	Material Topics	Description
(1)	Circular Economy	In addition to the topics directly named "circular economy" or "low-carbon circular economy" in the 2017-2020 ESG reports, this study also includes "energy use and emissions reduction", "energy conservation and emissions reduction", "waste co-processing", "resource co-processing", "management of raw materials and water resources" and "green energy and energy storage", and "energy use" in this topic. The main reason is that TCC Group discloses the handling and reuse of waste, raw materials, water, and energy in

		<p>these topics. Regarding waste, in the production process of cement, a lot of waste heat and waste materials are generated, which TCC Group transfers to the power generation department for use. From this example, it can be understood why this study merged these topics into Circular Economy.</p>
(2)	<p>Climate actions, Sustainable Strategies and Emissions Reduction</p>	<p>This topic includes material topics such as "energy use and emissions reduction", "energy conservation and emissions reduction", "climate actions and science-based targets", "climate actions and net-zero emissions", "sustainable products", and "sustainable strategies". In this category, this study includes all material topics related to energy and emissions reduction and overall climate strategies, representing TCC Group's efforts towards climate change. This can be divided into three aspects, including (a) overall climate strategies, such as topics named "climate actions" or "sustainable strategies", (b) energy and emissions reduction or achieving emissions reduction through innovative products, including material topics named "energy conservation and emissions reduction" or "sustainable products" or "science-based targets". In part (b), in 2021, TCC Group used the more ambitious term "net-zero emissions" to describe this topic. It should be noted that in the ESG reports for 2015 and 2016, the material topic mentioned both "energy conservation" and "emissions reduction". This study categorizes energy-related issues as (1) Circular Economy, and emissions reduction issues as (2) Climate actions and emissions reduction.</p>

(3)	Pollution control and management	This study categorizes "pollution control and management" and "management of pollution and emissions" topics under this category.
(4)	Biodiversity and environmental protection	This category includes all material topics related to the environment, ecological conservation, and biodiversity.
(5)	Human Resources, Workplace Health and Safety	This category includes all material topics related to human resources, including workplace safety, human rights protection, talent recruitment, and employee training.
(6)	Community	This topic includes two material topics, "local inclusion" and "community feedback," which refer to the interaction between TCC Group and the community.
(7)	Corporate Governance and Ethical Management	As the name suggests, this topic discusses TCC Group's corporate governance and ethical management practices in each year's ESG report.
(8)	Operational Performance	All material topics named "operational performance" in TCC Group's ESG reports are included in this category. In addition, the "dividend policy" topic from 2014 is also included.
(9)	Risk Management	All topics named "risk control" or "risk management" in TCC Group's ESG reports are classified under this category.
(10)	Legal	This category is less controversial as all TCC Group's ESG reports

	Compliance	are named "legal compliance".
(11)	Information Disclosure and Transparency	Similarly, this category includes topics named "Information disclosure and transparency" or "information transparency" with little classification controversy.
(12)	Product Quality and Product Risk	This category only appeared in the 2015 and 2016 ESG reports and both were included under this category.
(13)	Service and Customer Satisfaction	Topics named "service and customer satisfaction" or "customer satisfaction" are classified under this category.
(14)	Supplier Management	Topics named "supplier management" or "supplier agreement" as well as "strategic alliance" are classified under this category, representing the interaction between TCC Group and its suppliers.

Figure 3. Material Topics of TCC Group from 2014 to 2021

Number	Topics focused in this research	2021	2020	2019	2018	2017	2016	2015	2014
1	Circular Economy	再生資源回收利用 resource for processing	廢棄物回收利用 waste for processing	廢棄物回收利用 waste for processing	“低碳循環經濟” low-carbon circular economy	“低碳循環經濟” low-carbon circular economy			
2	Climate Actions, Sustainable Strategies and Emissions Reduction	綠色能源與儲能 green energy and energy storage 氣候行動與科學目標 climate actions and net-zero emissions 永續產品 sustainable products 污染防治管理 pollution control and management	循環經濟 circular economy 氣候行動與科學目標 climate actions and science-based targets 永續產品 sustainable products 污染防治管理 pollution control and management	循環經濟 circular economy 氣候行動與科學目標 climate actions and science-based targets 永續產品 sustainable products 污染防治管理 pollution control and management	能源使用 energy use 節能減碳 energy conservation and emissions reduction 永續策略 sustainable strategies 污染防治管理 management of pollution and emissions	能源使用 energy use 節能減碳 energy conservation and emissions reduction 永續策略 sustainable strategies 永續策略 sustainable strategies	能源使用及節能減碳 energy use and emissions reduction 能源使用及節能減碳 energy use and emissions reduction 永續策略 sustainable strategies	永續發展 sustainable development	
3	Pollution Control and Management	污染防治管理 pollution control and management	污染防治管理 pollution control and management	污染防治管理 pollution control and management	污染防治管理 management of pollution and emissions	污染防治管理 management of pollution and emissions			
4	Biodiversity and Environmental Protection	生物多樣性 biodiversity	生態復育 ecological restoration	生態復育 ecological restoration	環境保護與生態保育 environmental protection and ecological conservation	環境保護與生態保育 environmental protection and ecology conservation	“環境保護及生態保育” environmental protection and ecology conservation	“環境保護及生態保育” environmental protection and ecology conservation	環境保護 environment protection
5	Human Resources, Workplace Health and Safety	職場健康與安全 workplace health and safety 人才培育及發展 talent cultivation and development	職場健康與安全 workplace health and safety 人權保障及員工照顧 human right guarantees and employee care	職場健康與安全 workplace health and safety 人權保障及員工照顧 human right guarantees and employee care	“健全安全與員工照顧” work place safety and employee care 人才招募與培育 talent recruitment and cultivation	“健全安全與員工照顧” occupational safety and employee care 人才招募與培育 talent recruitment and cultivation	“健全安全與員工照顧” occupational safety and employee care 人才招募與培育 talent recruitment and cultivation	“健全安全與員工照顧” occupational safety and employee care 人才招募與培育 talent recruitment and cultivation	安全健康 workplace safety 身心健康 physical and mental health 職場訓練 workplace training 薪資福利 Salary and benefits 穩定就業 stable employment 社區回饋 community feedback
6	Community	地方社群 local inclusion							
7	Corporate Governance and Ethical Management	誠信經營 ethical management	公司治理及誠信經營 corporate governance and ethical management	公司治理及誠信經營 corporate governance and ethical management	誠信經營 ethical management	誠信經營 ethical management	“公司治理” corporate governance	“公司治理” corporate governance	
8	Operational Performance	營運績效 operational performances	營運績效 operational performances	營運績效 operational performances	營運績效 operational performances	營運績效 operational performance	營運績效 operational performance	營運績效 operational performance	股息回饋 dividend policy
9	Risk Management	風險管理 risk control	風險管理 risk management	風險管理 risk management	風險管理 risk management	風險管理 risk management	風險管理 risk management	風險管理 risk management	風險管理 risk management
10	Legal Compliance	法令遵循 legal compliance	法令遵循 legal compliance	法令遵循 legal compliance	法令遵循 compliance	法令遵循 compliance	法令遵循 compliance	法令遵循 compliance	
11	Information Disclosure and Transparency								資訊透明 information transparency
12	Product Quality and Product Risk								
13	Service and Customer Satisfaction								客戶滿意度 customer satisfaction
14	Supplier Management								供應商 supplier agreement 策略聯盟 strategic alliance

3.6. Material Topics of ACC Group focused in this study

As for the material topics of ACC Group, this study will focus on 17 topics, including: (1) Raw Materials, Waste and Circular Economy, (2) Energy, (3) Water Risk, (4) Low carbon green manufacturing process and Emissions, (5) Legal Compliance, (6) Sustainable mining and sustainable strategy, (7) Sustainable environment education, (8) Human Resources , Labor/Employer relationship, Occupational Safety and Health, (9) Local Community and Rights of Indigenous People, (10) Corporate Governance and Economic Performance, (11) Risk Management and Indirect Economic Impact, (12) Market Status, Image and communication, (13) Transportation, (14) Grievance mechanism for environmental issues, (15) Anti-corruption, (16) Anti-competitive behavior, and (17) Customer Health, Safety and privacy.

Similar to the material topics section for TCC Group, this study will explain the process of generating these 17 topics for ACC Group in **table 2** and **figure 4**.

Table 2. 17 Material Topics of ACC Group

No.	Material Topics	Description
(1)	Raw Materials, Waste and Circular Economy	This topic includes material topics named "Raw materials", "Wastes", and "Circular economy". These three topics are closely connected, representing ACC Group's raw materials input for product manufacturing, waste generated during production, and the circular economy in which waste is reused as raw materials. Therefore, this study combines these three topics for discussion.
(2)	Energy	This topic has been named "Energy" since 2013 and is therefore a less controversial topic. It mainly presents ACC Group's energy usage status.
(3)	Water Risk	Similar to Energy, this topic has always been named "Water

		Risk". It mainly presents ACC Group's water resource usage status.
(4)	Low Carbon Green Manufacturing Process and Emissions	<p>In recent years, ACC Group has preferred to use "Low Carbon Green Manufacturing Process" to refer to this material topic. This study will discuss all of ACC Group's carbon reduction measures in its cement processes and products under this topic.</p> <p>Additionally, this study also includes "Emissions" as a topic because ACC Group, in addition to describing harmful gas emissions, has also devoted many pages to describing carbon dioxide emissions and reduction, thus making it similar to "Low Carbon Green Manufacturing Process".</p>
(5)	Legal Compliance	This topic refers to all material topics related to legal compliance in ACC Group's ESG reports. Before 2015, this topic also included concerns regarding product and community regulations, but in recent years, only environmental regulations have been reported.
(6)	Sustainable mining and sustainable strategy	This topic describes ACC Group's overall climate strategy and efforts to promote biodiversity. In some years, ACC Group used "Sustainable mining mountain" or "mining mountain" to refer to this section, but both focused on ecological and biodiversity concerns.
(7)	Sustainable environment education	This topic refers to all material topics in ACC Group's ESG reports named "Sustainable environment education." As the names are all identical, there should be no dispute about this categorization.

(8)	Human Resources, Labor/Employer relationship, Occupational Safety and Health	All material topics related to human resources are discussed in this topic, including labor relations, employee training, occupational health and safety, compensation and benefits, diversity and inclusion, and human rights, among others
(9)	Local Community and Rights of Indigenous People	ACC Group has included this material topic in its ESG reports since 2013. As the name is consistent, this research adopts the same term.
(10)	Corporate Governance and Economic Performance	This topic mainly discusses Economic Performance, but in 2021, ACC Group added Corporate Governance as a new material topic. This study combines these two similar material topics for discussion.
(11)	Risk Management and Indirect Economic Impact	This topic includes two material topics, "Indirect economic impact" and "Risks and opportunity management," which refer to ACC Group's efforts to identify and manage risks in its ESG report.
(12)	Market Status, Image and Communication	This topic includes three parts: "market status," "market image," and "marketing communication."
(13)	Transportation	ACC Group's material topics "Transportation of product" and

		"Transportation" in the ESG report are included in this topic
(14)	Grievance mechanism for environmental issues	ACC Group's material topics related to grievance mechanism for environmental issues from 2013 to 2015 are classified under this topic
(15)	Anti-corruption	Similar to the previous topic, material topics with the same name are grouped under this category.
(16)	Anti- competitive behavior	ACC Group's material topics with the same name from 2013 to 2016 are classified under this topic.
(17)	Customer Health, Safety and privacy	ACC Group's concerns for customer rights and welfare presented in their ESG reports are included in this topic.

Figure 4. Material Topics of ACC Group from 2013 to 2021

Number	Topics focused in this research	2021	2020	2019	2018	2017	2016	2015	2014	2013
1	Raw Materials, Waste and Circular Economy	原料採購 廢棄物管理 Circular economy	原料採購 廢棄物管理 Circular economy	原料採購 廢棄物管理 Circular economy	原料採購 廢棄物管理 Circular economy	原料採購 廢棄物管理 Circular economy	原料採購 廢棄物管理 Circular economy	原料採購 廢棄物管理 Circular economy	原料採購 廢棄物管理 Circular economy	原料採購 廢棄物管理 Circular economy
2	Energy	能源 Energy	能源 Energy	能源 Energy	能源 Energy	能源 Energy	能源 Energy	能源 Energy	能源 Energy	能源 Energy
3	Water Risk	水資源 Water risk	水資源 Water risk	水資源 Water risk	水資源 Water risk	水資源 Water risk	水資源 Water risk	水資源 Water risk	水資源 Water risk	水資源 Water risk
4	Low carbon green manufacturing process and Emissions	低碳製造與溫室氣體 Low carbon green manufacturing process Emissions	低碳製造與溫室氣體 Low carbon green manufacturing process Emissions	低碳製造與溫室氣體 Low carbon green manufacturing process Emissions	低碳製造與溫室氣體 Low carbon green manufacturing process Emissions	低碳製造與溫室氣體 Low carbon green manufacturing process Emissions	低碳製造與溫室氣體 Low carbon green manufacturing process Emissions	低碳製造與溫室氣體 Low carbon green manufacturing process Emissions	低碳製造與溫室氣體 Low carbon green manufacturing process Emissions	低碳製造與溫室氣體 Low carbon green manufacturing process Emissions
5	Legal Compliance	環境法規 Environmental regulations	環境法規 Environmental regulations	環境法規 Environmental regulations	環境法規 Environmental regulations	環境法規 Environmental regulations	環境法規 Environmental regulations	環境法規 Environmental regulations	環境法規 Environmental regulations	環境法規 Environmental regulations
6	Sustainable mining and sustainable strategy	可持續採礦 Sustainable mining Sustainable strategy	可持續採礦 Sustainable mining Sustainable strategy	可持續採礦 Sustainable mining Sustainable strategy	可持續採礦 Sustainable mining Sustainable strategy	可持續採礦 Sustainable mining Sustainable strategy	可持續採礦 Sustainable mining Sustainable strategy	可持續採礦 Sustainable mining Sustainable strategy	可持續採礦 Sustainable mining Sustainable strategy	可持續採礦 Sustainable mining Sustainable strategy
7	Sustainable environment education	可持續環境教育 Sustainable environment education	可持續環境教育 Sustainable environment education	可持續環境教育 Sustainable environment education	可持續環境教育 Sustainable environment education	可持續環境教育 Sustainable environment education	可持續環境教育 Sustainable environment education	可持續環境教育 Sustainable environment education	可持續環境教育 Sustainable environment education	可持續環境教育 Sustainable environment education
8	Human Resources, Labor/ Employer relationship, Occupational Safety and Health	人力資源 Labor-employer relationship Occupational safety and health 人才培訓與人才 Attracting and retaining talents	人力資源 Labor-employer relationship Occupational safety and health 人才培訓與人才 Attracting and retaining talents	人力資源 Labor-employer relationship Occupational safety and health 人才培訓與人才 Attracting and retaining talents	人力資源 Labor-employer relationship Occupational safety and health 人才培訓與人才 Attracting and retaining talents	人力資源 Labor-employer relationship Occupational safety and health 人才培訓與人才 Attracting and retaining talents	人力資源 Labor-employer relationship Occupational safety and health 人才培訓與人才 Attracting and retaining talents	人力資源 Labor-employer relationship Occupational safety and health 人才培訓與人才 Attracting and retaining talents	人力資源 Labor-employer relationship Occupational safety and health 人才培訓與人才 Attracting and retaining talents	人力資源 Labor-employer relationship Occupational safety and health 人才培訓與人才 Attracting and retaining talents
9	Local Community and Rights of Indigenous People	原住民保護 Rights of indigenous people Local community	原住民保護 Rights of indigenous people Local community	原住民保護 Rights of indigenous people Local community	原住民保護 Rights of indigenous people Local community	原住民保護 Rights of indigenous people Local community	原住民保護 Rights of indigenous people Local community	原住民保護 Rights of indigenous people Local community	原住民保護 Rights of indigenous people Local community	原住民保護 Rights of indigenous people Local community
10	Corporate Governance and Economic Performance	經濟績效 Economic performance Industrial emissions impact Emissions management	經濟績效 Economic performance Industrial emissions impact Emissions management	經濟績效 Economic performance Industrial emissions impact Emissions management	經濟績效 Economic performance Industrial emissions impact Emissions management	經濟績效 Economic performance Industrial emissions impact Emissions management	經濟績效 Economic performance Industrial emissions impact Emissions management	經濟績效 Economic performance Industrial emissions impact Emissions management	經濟績效 Economic performance Industrial emissions impact Emissions management	經濟績效 Economic performance Industrial emissions impact Emissions management
11	Risk Management and Indirect Market Status, Image and communication	風險管理 Risks and opportunity management	風險管理 Risks and opportunity management	風險管理 Risks and opportunity management	風險管理 Risks and opportunity management	風險管理 Risks and opportunity management	風險管理 Risks and opportunity management	風險管理 Risks and opportunity management	風險管理 Risks and opportunity management	風險管理 Risks and opportunity management
12	Transportation	交通運輸 Transportation	交通運輸 Transportation	交通運輸 Transportation	交通運輸 Transportation	交通運輸 Transportation	交通運輸 Transportation	交通運輸 Transportation	交通運輸 Transportation	交通運輸 Transportation
13	Grievance mechanism for environmental issues	環境問題申訴機制 Grievance mechanism for environmental issues	環境問題申訴機制 Grievance mechanism for environmental issues	環境問題申訴機制 Grievance mechanism for environmental issues	環境問題申訴機制 Grievance mechanism for environmental issues	環境問題申訴機制 Grievance mechanism for environmental issues	環境問題申訴機制 Grievance mechanism for environmental issues	環境問題申訴機制 Grievance mechanism for environmental issues	環境問題申訴機制 Grievance mechanism for environmental issues	環境問題申訴機制 Grievance mechanism for environmental issues
14	Anti-corruption	反貪污 Anti-corruption	反貪污 Anti-corruption	反貪污 Anti-corruption	反貪污 Anti-corruption	反貪污 Anti-corruption	反貪污 Anti-corruption	反貪污 Anti-corruption	反貪污 Anti-corruption	反貪污 Anti-corruption
15	Anti-competitive behavior	反競爭行為 Anti-competitive behavior	反競爭行為 Anti-competitive behavior	反競爭行為 Anti-competitive behavior	反競爭行為 Anti-competitive behavior	反競爭行為 Anti-competitive behavior	反競爭行為 Anti-competitive behavior	反競爭行為 Anti-competitive behavior	反競爭行為 Anti-competitive behavior	反競爭行為 Anti-competitive behavior
16	Customer Health, Safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy
17	Customer Health, Safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy	顧客健康、安全及隱私 Customer health, safety and privacy

In the next chapter, which is the main research findings section, this study will analyze "Hypothesis 1: There is a significant difference in ESG performance among firms with similar business bases and levels of business performance." and then use TCC Group's 14 Material topics and ACC Group's 17 Material topics to analyze whether the ESG performance of the two companies conforms to CSV, thus verifying "Hypothesis 2: If two companies with similar business bases and levels of business performance do not have similar ESG performance, CSV may be one of the key influencing mechanisms."

Chapter IV. Result

4.1. Validation of Hypothesis 1: There is a significant difference in ESG performance among firms with similar business bases and levels of business performance.

To verify Hypothesis 1, this study must assess the independent variable: "The business bases and levels of business performance between the companies" and the dependent variable: "ESG performance". The following paragraph focuses on evaluating the independent variable.

To evaluate the independent variable, this study uses three criteria: "similar industry and business base," "revenue highly correlated," and "similar ROE and ROA." These criteria have a hierarchical order. "Similar industry and business base" represents a company's production location and market. "Revenue highly correlated" indicates the amount of revenue generated by the company from the region mentioned earlier. "Similar ROE and ROA" represents the efficiency with which the company earns profits from revenue. If the two companies are similar in these three aspects, this study can conclude that they are similar companies.

4.1.1. Similar industry and business base

This study primarily relied on data from the annual reports of TCC and ACC to determine the level of similarity between the two companies with respect to the "Similar industry and business base" criterion. As shown in **figure 5** and **figure 6** from their 2021 annual reports, 83.98% of TCC Group's revenue came from its cement division, which produces cement and precast concrete products, while ACC Group focuses on cement and clinker, with 95% of its revenue coming from this area and the remaining 5% contributed by fly ash powder. Although TCC Group's revenue sources are relatively more diversified, both companies are appropriately named as over 80% of their revenue comes from the cement sector, indicating a similar focus on the cement industry.

Figure 5. Business Overview of TCC Group (TCC Group, 2022a)

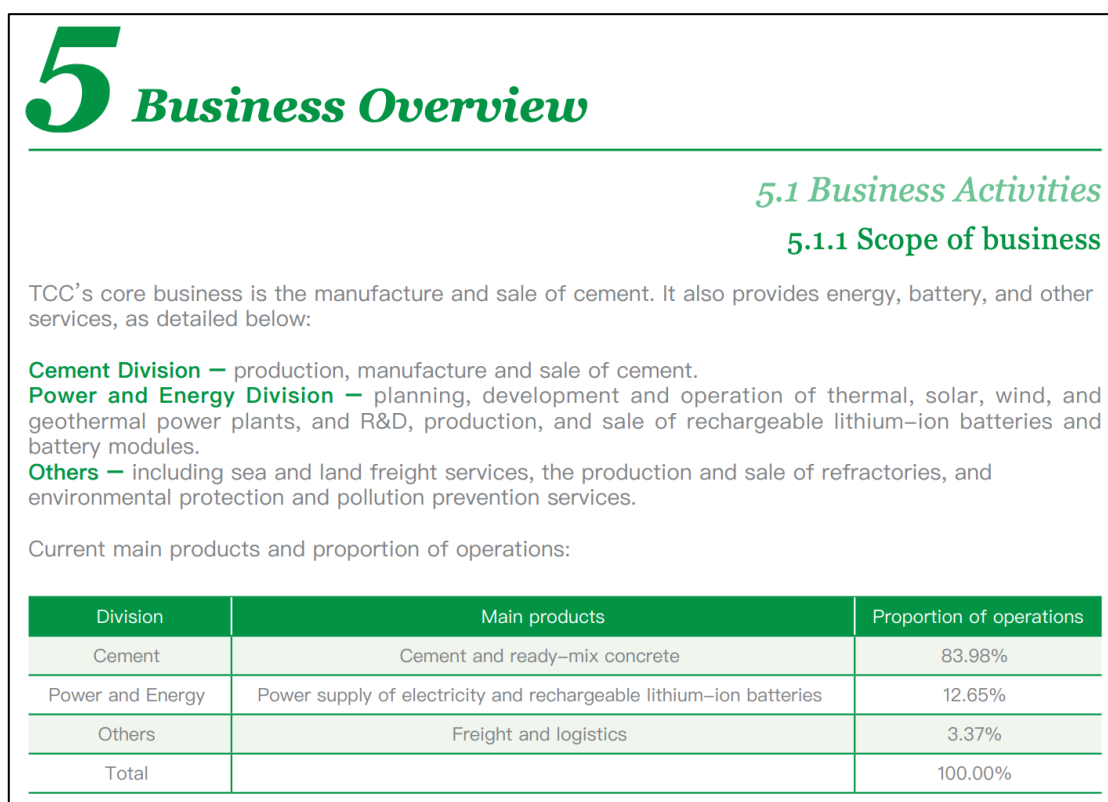
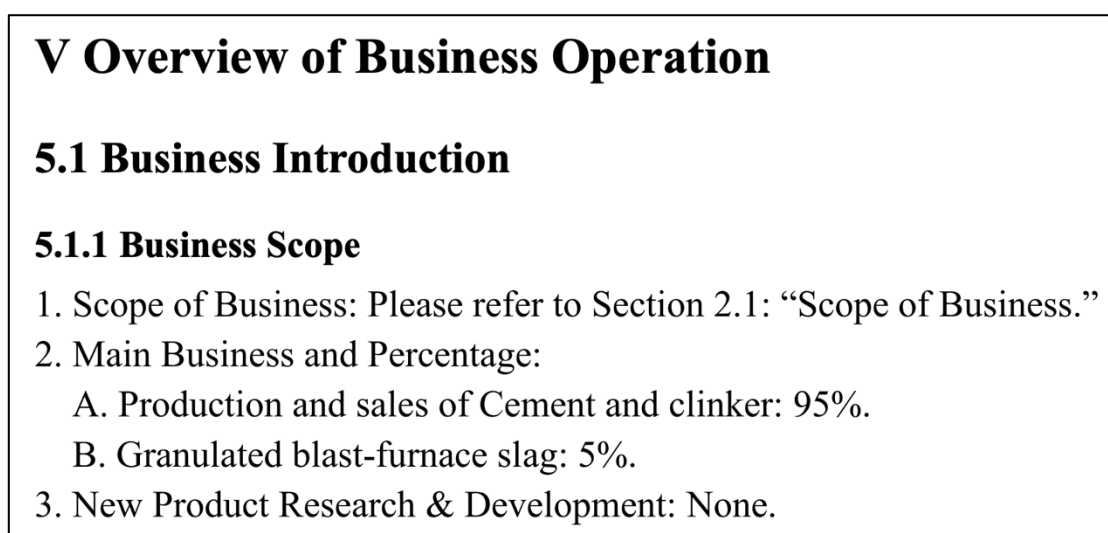


Figure 6. Overview of Business Operation of ACC Group (ACC Group, 2022a)



In addition to a similar industry focus, the two companies also have similar sales markets. **Table 3** shows the sales statistics of both companies in various regions in 2021, revealing that both companies currently have a strong presence in mainland China, where their cement sales account for nearly 90% of the total. The remaining sales are primarily in

the Taiwanese market, accounting for only about 10%.

From the industries and markets that TCC Group and ACC Group focus on, it can be inferred that both companies have a similar strategic focus and resource allocation.

Table 3. 2021 Revenue Sources of TCC Group and ACC Group by Region

2021 cement sales volume (10,000 tons)		Taiwan	Mainland China	Other Districts	Sum
TCC Group	Volume (10,000 tons)	511	4455	82	5048
	Proportion	10.12%	88.25%	1.62%	100%
ACC Group	Volume (10,000 tons)	297	2968	70	3335
	Proportion	8.91%	89.00%	2.08%	100%

4.1.2. Revenue highly correlated

Next is the degree of revenue correlation between the two companies. As both TCC and ACC primarily operate in the cement industry and target the Chinese market, it can be inferred that their revenues are influenced by similar internal and external factors and thus highly correlated. Although TCC has expanded into the energy storage and power generation industries in recent years, the proportion of revenue generated is still low, leading to the expectation of high revenue correlation between the two companies.

Based on 21 pairs of annual revenue data from 2001 to 2021 shown in **Figure 7**, the Pearson correlation coefficient test reveals a correlation of 0.942 and a significance of 0.000 between the two companies. The statistical evidence shown in **Figure 8** suggests that the revenue of TCC and ACC are highly interdependent, indicating that both companies are subject to similar internal and external stimuli. This further supports the argument that the two

companies are highly similar in this study.

Figure 7. Revenue(Thousand TWD) of TCC Group and ACC Group from 2001 to 2021

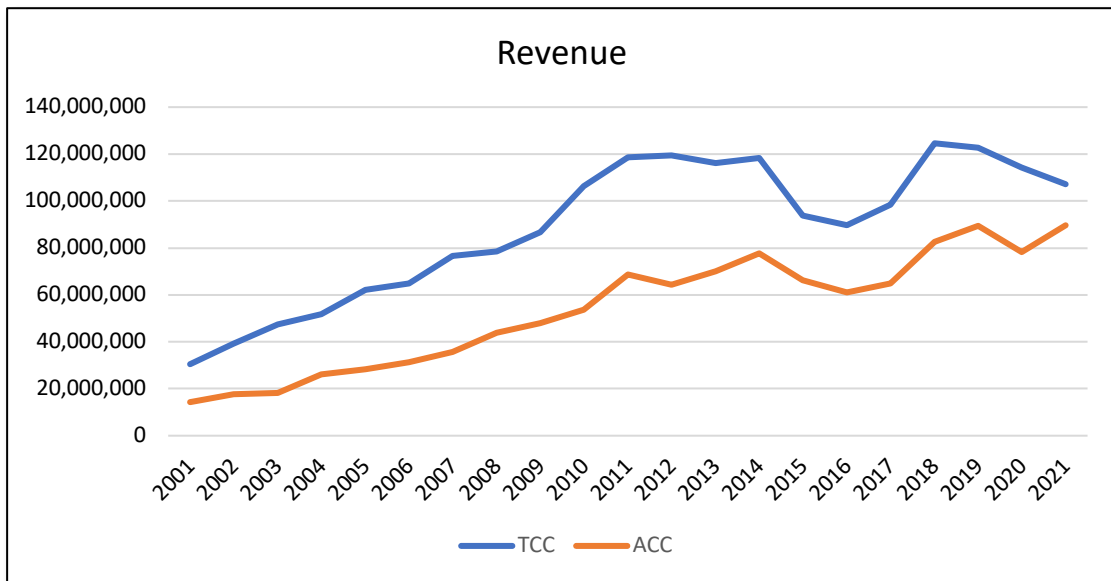


Figure 8. Pearson Correlation Coefficient Test of TCC Group's Revenue and ACC Group's

Revenue

Coefficients ^a						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	27176638.2	5502173.00		4.939	.000
	revenue_ACC	1.146	.093	.942	12.273	.000

a. Dependent Variable: revenue_TCC

4.1.3. Similar ROE and ROA

The next section discusses whether the ROE and ROA of the two companies are similar. Even if the two companies focus on similar production locations and markets, and their revenues have high correlation due to similar internal and external factors, there would still be fundamental differences between them if their profitability efficiency differs. Therefore, this study selected ROE and ROA as indicators of revenue efficiency converted to profit. The ROE and ROA of TCC Group and ACC Group are shown in **Figure 9** and **Figure 11**.

This study uses the ROE and ROA data of the two companies from 2001 to 2021 to

determine whether there are significant differences between them using ANOVA analysis.

Figure 10 shows the ANOVA analysis for ROE, the significance level was 0.995, indicating that there was no statistically significant disparity observed in the ROE between the two groups. As for ROA shown in **Figure 12**, although the significance level was lower than that of ROE at 0.545, it was still far higher than the threshold of 0.05, suggesting that there was no statistically significant disparity in the ROA between the two groups.

From the above statistical data, it can be seen that the efficiency of converting revenue into profit is also very similar between TCC Group and ACC Group.

Figure 9. ROE(%) of TCC Group and ACC Group

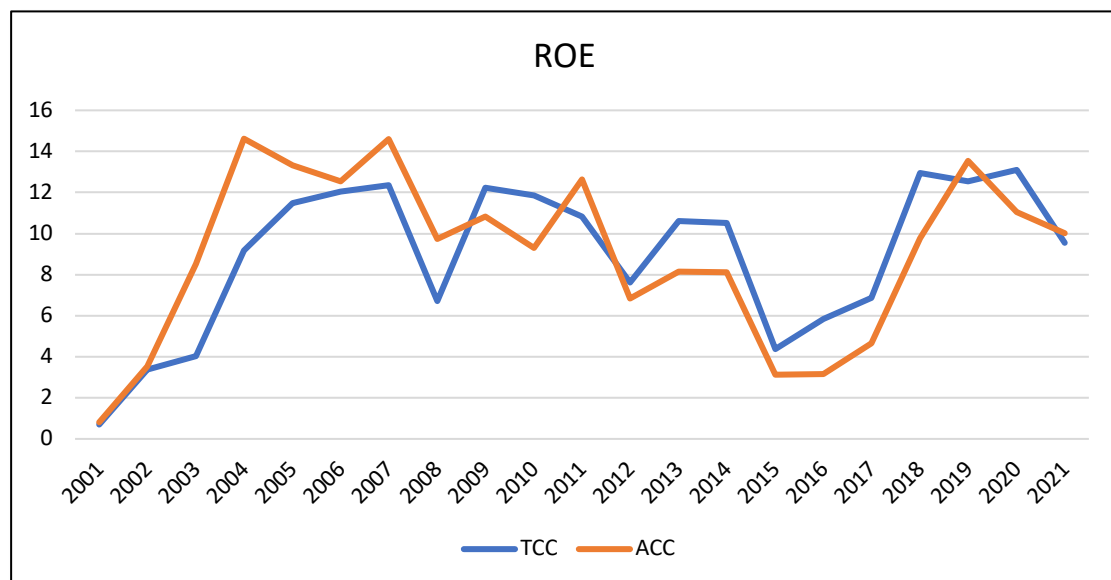


Figure 10. ANOVA Analysis of ROE Between TCC Group and ACC Group

Tests of Between-Subjects Effects					
Dependent Variable: ROE					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.001 ^a	1	.001	.000	.995
Intercept	3395.163	1	3395.163	227.963	.000
comp	.001	1	.001	.000	.995
Error	595.740	40	14.893		
Total	3990.904	42			
Corrected Total	595.741	41			
a. R Squared = .000 (Adjusted R Squared = -.025)					

Figure 11. ROA(%) of TCC Group and ACC Group

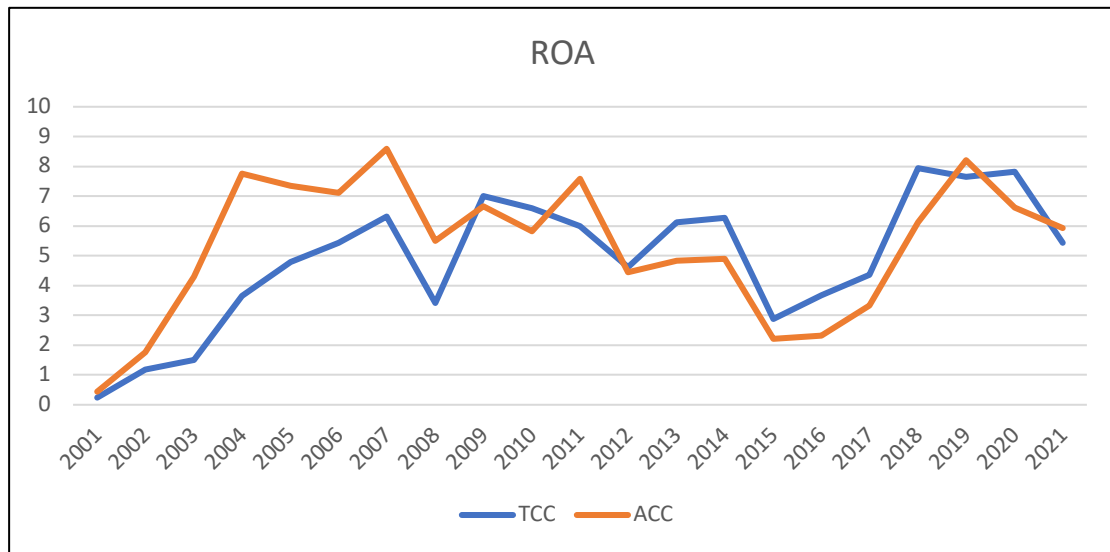


Figure 12. ANOVA Analysis of ROA Between TCC Group and ACC Group

Tests of Between-Subjects Effects					
Dependent Variable: ROA					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.865 ^a	1	1.865	.373	.545
Intercept	1097.628	1	1097.628	219.397	.000
comp	1.865	1	1.865	.373	.545
Error	200.118	40	5.003		
Total	1299.611	42			
Corrected Total	201.983	41			

a. R Squared = .009 (Adjusted R Squared = -.016)

4.1.4. The business bases and levels of business performance between the companies

The two companies focus on similar industries and markets, have highly correlated revenue, and nearly identical ROE and ROA. Based on these findings, this study concludes that the similarity between the two companies is extremely high.

4.1.5. ESG performance

As described in the Chapter III, this study will use the six ESG scores and ratings compiled by TDCC to evaluate the ESG performance of the two companies. From **table 4**, it can be seen that, except for the ISS ESG rating, where both companies have the same rating,

TCC Group outperforms ACC Group in the other five evaluations. The most significant difference is in the MSCI ESG rating, where TCC Group received an A rating (second only to AAA and AA), while ACC Group only received a B rating (two levels lower than TCC Group's A rating). Moreover, since the MSCI ESG rating is one of the most widely used ESG rating, this study infers that TCC Group's ESG performance is better than that of ACC Group.

Table 4. ESG Performance of TCC and ACC Group (TDCC, 2023)

	Sustainalytics ESG Risk Score (100-0, with 0 being the best score)	MSCI ESG Rating (AAA- CCC, with AAA being the best rating)	FTSE Russell ESG Rating (0- 5, with 5 being the best rating)	ISS ESG Rating (A-D, with A being the best rating)	S&P Global ESG Score (0- 100, with 100 being the best score)	Moody's ESG Score (0- 100, with 100 being the best score)
TCC Group	25.37	A	3.3	D+	82	41
ACC Group	27.86	B	3.5	D+	70	37

4.1.6. Hypothesis 1: There is a significant difference in ESG performance among firms with similar business bases and levels of business performance.

Based on the above discussion, even though TCC Group and ACC Group are two companies with similar business bases and levels of business performance, their ESG performance is vastly different. This study confirms Hypothesis 1 is true, which makes the researchers curious about the reasons for such a difference. Therefore, this study will move on to the discussion of Hypothesis 2, which is " If two companies with similar business bases

and levels of business performance do not have similar ESG performance, CSV may be one of the key influencing mechanisms.”

4.2. Validation of Hypothesis 2: If two companies with similar business bases and levels of business performance do not have similar ESG performance, CSV may be one of the key influencing mechanisms.

In this section, the 14 material topics identified as belonging to TCC Group and the 17 material topics belonging to ACC Group in Chapter III will be applied to the three criteria proposed by Menghwar and Daood (2021). These three criteria are "Strategic Process," "Societal Problem's Alignment with the Value Chain," and "Direct Economic Profit."

4.2.1. "Strategic Process"

Regarding "Strategic Process," Menghwar and Daood (2021) defined it as a company having a clear plan and regularly evaluating and updating it to ensure that it aligns with the company's strategy and goals.

Although Menghwar and Daood (2021) did not explicitly define the operational definition of "Strategic Process," this study defined and explained it based on its content. Menghwar and Daood (2021) mentioned two parts of "Strategic Process," including (A) having a clear plan and (B) regularly evaluating and updating it. In the ESG report, the company must have a clear plan and analysis for each material topic, so this study assumed that as long as a topic is presented in the ESG report, it meets the criterion of (A) having a clear plan. In other words, all 14 material topics of TCC Group and 17 material topics of ACC Group can pass this criterion. However, it may not be the case for (B) "regularly evaluating and updating." This study selected TCC Group's reports from 2014 to 2021 and ACC Group's reports from 2013 to 2021, and found that some material topics only appeared once or were emphasized by the company initially but were not selected as material topics in recent years. This obviously does not meet the requirement of (B) "regularly evaluating and updating" by

Menghwar and Daood (2021).

Similar to (A) "clear plans", Menghwar and Daood (2021) did not provide a definition for (B) "regular assessment and updates". This study defines (B) as a topic that has appeared in the company's material topics for five consecutive years and in 2021. This study believes that being identified as a material topic for five consecutive years demonstrates the company's importance in the topic. In addition, repeating the description of the same topic each year will inevitably assess the topic and update the company's response to the material topic for that year.

Using this standard, TCC Group's (6) Community, (11) Information Disclosure and Transparency, (12) Product Quality and Product Risk, (13) Service and Customer Satisfaction, and (14) Supplier Management were identified as material topics that do not belong to CSV. The reason is that while (6) Community appeared in 2021, the last time it appeared was in 2014, which does not meet this study's definition of (B) "regular evaluation and updating." Similarly, (11) Information Disclosure and Transparency, (12) Product Quality and Product Risk, (13) Service and Customer Satisfaction, and (14) Supplier Management last appeared in 2016 or 2015 and were not regularly evaluated and updated. Therefore, as shown in **Figure 13**, this study marked the "Strategic Process" part of these five topics as not meeting the criteria and only kept the remaining nine topics for the next stage of evaluation. These nine topics include: (1) Circular Economy, (2) Climate Actions, Sustainable Strategies and Emissions Reduction, (3) Pollution Control and Management, (4) Biodiversity and Environmental Protection, (5) Human Resources, Workplace Health and Safety, (7) Corporate Governance and Ethical Management, (8) Operational Performance, (9) Risk Management, (10) Legal Compliance.

Figure 13. "Strategic Process" of 14 Material Topics of TCC Group

Number	Topics focused in this research	Strategic Process	Societal problem's alignment with the value chain		Direct economic profit	CSV or Not
			Societal problem	Alignment with the value chain		
(1)	Circular Economy	O				
(2)	Climate Actions, Sustainable Strategies and Emissions Reduction	O				
(3)	Pollution Control and Management	O				
(4)	Biodiversity and Environmental Protection	O				
(5)	Human Resources, Workplace Health and Safety	O				
(6)	Community	X				
(7)	Corporate Governance and Ethical Management	O				
(8)	Operational Performance	O				
(9)	Risk Management	O				
(10)	Legal Compliance	O				
(11)	Information Disclosure and Transparency	X				
(12)	Product Quality and Product Risk	X				
(13)	Service and Customer Satisfaction	X				
(14)	Supplier Management	X				

Upon examining ACC Group's material topics using the same approach, (12) Market Status, Image and Communication, (13) Transportation, (14) Grievance Mechanism for Environmental Issues, (15) Anti-Corruption, (16) Anti-Competitive Behavior, and (17) Customer Health, Safety and Privacy did not pass Menghwar and Daood's (2021) "Strategic Process" test. The reason being that these topics have not been included in ACC Group's core focus since 2017, therefore not meeting the criteria of regular evaluation and update. As a result, this study marks the "Strategic Process" part of these five topics as non-compliant, and only considers the remaining 11 topics for further evaluation. These 11 topics include (1) Raw Materials, Wastes and Circular Economy, (2) Energy, (3) Water Risk, (4) Low carbon green manufacturing process and Emissions, (5) Legal Compliance, (6) Sustainable Mining and Sustainable Strategy, (7) Sustainable Environment Education, (8) Human Resources, Labor/Employer Relationship, Occupational Safety and Health, (9) Local Community and Rights of Indigenous People, (10) Corporate Governance and Economic Performance, and (11) Risk Management and Indirect Economic Impact.

Figure 14. "Strategic Process" of 17 Material Topics of ACC Group

Number	Topics focused in this research	Strategic Process	Societal problem's alignment with the value chain		Direct economic profit	CSV or Not
			Societal problem	Alignment with the value chain		
(1)	Raw Materials, Wastes and Circular Economy	O				
(2)	Energy	O				
(3)	Water Risk	O				
(4)	Low carbon green manufacturing process and Emissions	O				
(5)	Legal Compliance	O				
(6)	Sustainable mining and sustainable strategy	O				
(7)	Sustainable environment education	O				
(8)	Human Resources , Labor/ Employer relationship, Occupational Safety and Health	O				
(9)	Local Community and Rights of Indigenous People	O				
(10)	Corporate Governance and Economic Performance	O				
(11)	Risk Management and Indirect Economic Impact	O				
(12)	Market Status, Image and communication	X				
(13)	Transportation	X				
(14)	Grievance mechanism for environmental issues	X				
(15)	Anti-corruption	X				
(16)	Anti-competitive behavior	X				
(17)	Customer Health, Safety and privacy	X				

4.2.2. "Societal Problem's Alignment with the Value Chain"

The next criterion proposed by Menghwar and Daood (2021) is "Societal Problem's Alignment with the Value Chain," in which they propose that the identified societal issue should be intricately linked to the primary value chain. This is due to the fact that a CSV approach should have a direct influence on the fundamental business model, and the more distant it is from the primary business model, the less aligned it is with the principles of CSV.. This study further deconstructs this criterion to determine whether an ESG action taken by a company is related to solving a social problem and whether it is relevant to the value chain. The reason for deconstructing this criterion is that many ESG actions taken by companies are not aimed at solving social problems, but are instead required to respond to specific regulatory requirements or to address specific stakeholder concerns. For example, both TCC Group and ACC Group consider "Legal Compliance" and "Human Resources" as material topics, but the reason these topics became material topics was not because TCC Group and ACC Group intended to solve a social problem. Legal compliance is considered a material topic because the government requires the cement production industry to comply with specific regulations, making it an important issue for the government as a stakeholder. On the

other hand, "Human Resources" is relevant to the category of stakeholders, namely the employees. As material topics are determined based on stakeholder responses to questionnaires, the process of selecting material topics by TCC Group and ACC Group inevitably includes some responses aimed at meeting stakeholder expectations rather than addressing social problems or being relevant to the value chain.

Based on this situation, the next step in this study is to identify whether the material topics (9 for TCC Group and 11 for ACC Group) identified through the first criterion "Strategic Process" align with "societal problem's alignment with the value chain." This study will refer to the ESG reports of TCC Group and ACC Group to understand the meaning, policies, commitments, goals, etc. of each material topic and judge whether they meet this criterion.

4.2.2.1. "Societal Problem's Alignment with the Value Chain" of TCC Group

According to TCC Group's 2021 annual report, TCC Group has three main business segments: "Cement Business" (83.98% of revenue), "Power and Energy Business" (12.65% of revenue), and "Other Business" (3.37% of revenue). Although cement is still the core industry of TCC Group's revenue sources, the annual report devotes only one page to the industry overview of the "Cement Business" segment, while six pages are dedicated to the "Power and Energy Business" segment, and the "Other Business" segment is not mentioned at all. The chapters on technical research and development, business development plans, market analysis, the important uses of main products, and production processes all focus on the "Cement Business" and "Power and Energy Business" segments without mentioning the "Other Business" segment. From this part, this study can determine that TCC Group's core businesses are the "Cement" and "Power and Energy" segments. As long as a topic is related to the production, sales, or waste of these two core businesses, this study will judge it as "related to the value chain." Next, this study will judge whether TCC Group's nine material topics pass the "Societal Problem's Alignment with the Value Chain" criterion.

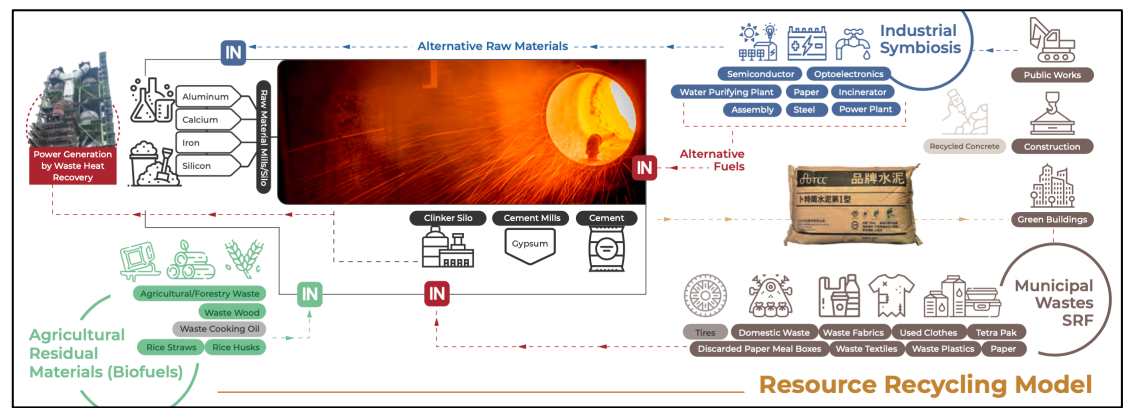
(1) Circular Economy:

This material topic corresponds to GRI indicators "GRI-306 Waste" and "GRI-302 Energy". In terms of "GRI-306 Waste", TCC Group's targets are to "recycle waste: reduce 1.25 million tons before 2025, 1.57 million tons before 2030, and 2.5 million tons by 2050" (TCC Group, 2022b). In the corresponding section of the ESG report, TCC Group mentioned that "most of the waste is harmless and recyclable, allowing resources, raw materials, and waste to circulate continuously in the industry chain, greatly reducing energy and resource consumption and waste generation, implementing the corporate philosophy of 'there is no waste in nature, and waste must be the beginning'." (TCC Group, 2022b). From this, this study can conclude that "Circular Economy" can help address the social issue of waste reduction. In addition, from the Resource Recycling Model shown in **Figure 15**, the waste generated from the production of TCC Group's main product cement can be recycled back to TCC Group's blast furnace for reuse, or can be used as alternative raw materials and fuels. The waste heat generated during cement production can also be supplied to TCC Group's power and energy department for power generation. In this aspect, not only does "GRI-306 Waste" solve the waste problem in society, but it is also closely related to TCC Group's core business.

Another major pillar of TCC Group in "Circular Economy" is the management and use of energy, referred to as "green energy and energy storage" in their 2021 ESG report. Saving energy usage can reduce carbon dioxide emissions, which can fundamentally solve social problems. In addition, the cement industry is a high-energy-consuming industry, and TCC Group can effectively use waste heat for power generation to reduce cement industry usage. For example, TCC Group "setting a target of installing 570 MW of renewable energy capacity under management by 2025, followed by 700 MW by 2030, and ultimately reaching a milestone of 1 GW by 2050." (TCC Group, 2022b) TCC Group's other core department, the "Electricity and Energy Department", is also directly related to this topic. Therefore, in terms

of energy management and use, this is also a topic that is aligned with the value chain, this study judges that "Circular Economy" can pass the verification of "Societal Problem's Alignment with the Value Chain".

Figure 15. The Resource Recycling Model and Circular Economy of TCC Group (TCC Group, 2022b)



(2) Climate Actions, Sustainable Strategies and Emissions Reduction:

This material topic corresponds to "GRI-302 Energy," "GRI-305 Emissions," and TCC Group's customized theme "Sustainable Products." This study defines this topic as TCC Group's overall carbon reduction strategy and various efforts to reduce carbon emissions by developing sustainable products. First, in terms of TCC Group's overall carbon reduction strategy, TCC Group has established a long-term objective of attaining carbon neutrality by 2050, employing three fundamental business pillars: "Low-Carbon Cement," "Resource Recycling," and "Green Energy," as strategic means to accomplish this target. In the Circular Economy section, this study has already examined the "Resource Recycling" and "Green Energy" part, and this section will explore "Low-Carbon Cement". This material topic clearly aims to address the issue of greenhouse gas emissions. In order to achieve the objective of restricting global temperature rise to below 1.5 degrees Celsius as outlined in the Paris Agreement, the Taiwanese government has set a policy of achieving net-zero emissions by 2050 (Executive Yuan, 2023). TCC Group also discloses in its ESG report how the group responds to this policy, including "initiating and passing a science-based target (SBT) to

achieve carbon neutrality for concrete by 2050" (TCC Group, 2022b). From this perspective, TCC Group's material topic is "related to solving social issues." The cement and energy industries are precisely the two core businesses of TCC Group. TCC Group intends to improve the production methods of these two businesses, and this study can also judge that this material topic is "related to the value chain." Therefore, "Climate Actions, Sustainable Strategies and Emissions Reduction" can also pass the verification of "Societal Problem's Alignment with the Value Chain."

(3) Pollution Control and Management:

This material topic responds to the pollution control aspects of "GRI-305 Emissions" and "GRI-306 Waste and Wastewater". TCC Group has set targets to reduce NO_x by 50%, SO_x by 30%, and TSP by 50% by 2025; to reduce NO_x by 70% and to achieve the lowest BACT levels for SO_x and TSP by 2030; and to reach the lowest BACT level for NO_x by 2050 (TCC Group, 2022b). In addition, TCC Group describes the effectiveness of water resource and waste management in the corresponding chapter. Although Taiwan has a humid climate, the rugged terrain and short time for runoff water to flow into the sea often result in water shortages in central and southern Taiwan during spring. In April 2023, Taiwan faced its most severe drought in nearly a century. This indicates that conserving water resources is a serious issue facing Taiwanese society. Moreover, reducing pollutant emissions during cement production and power generation can also contribute to solving social problems and making a positive impact on society. Cement and power generation industries are both water-intensive and generate large amounts of waste, making them relevant to TCC Group's value chain. Therefore, this study judges that "Pollution Control and Management" can pass the validation of "Societal Problem's Alignment with the Value Chain".

(4) Biodiversity and Environmental Protection:

TCC Group responds to the requirements of "GRI-304 Biodiversity" in this material topic and has set a goal of "joining the biodiversity program, achieving a 90% recovery rate

of native species by 2030 and 95% by 2050" (TCC Group, 2022b). The reason why the cement industry must pay attention to biodiversity is that mining may have an impact on local ecology, and the exclusive port required for cement may also impact marine ecology. Therefore, TCC Group recognizes this topic as a material topic. From the above description, it can be seen that this material topic not only can restore local biodiversity but also reduces the environmental damage caused by cement production, thus related to social issues and value chain. Therefore, this study judges that "Biodiversity and Environmental Protection" can pass the verification of "Societal Problem's Alignment with the Value Chain".

(5) Human Resources, Workplace Health and Safety:

In this material topic, TCC Group responds to the "GRI-401 Employment" , "GRI-403 Occupational Health and Safety" and "GRI-404 Training and Education" indicators, and sets goals such as "zero work-related injuries" and "investing more than NT\$25 million in talent development projects every year" (TCC Group, 2022b). In addition, in the corresponding chapters, TCC Group also describes issues such as talent development plans, salary and benefits systems, employee safety and care, employee rights protection, and diversity. Although these issues seem closely related to society, they are all in response to the expectations of employees as stakeholders, rather than to solve external social problems. Therefore, although "Human Resources, Workplace Health and Safety" is closely related to TCC Group's value chain, it does not attempt to solve social problems and cannot pass the "Societal Problem's Alignment with the Value Chain" validation.

(7) Corporate Governance and Ethical Management:

This material topic is established by TCC Group in response to the "GRI-205 Anti-Corruption" and "GRI-206 Anti-competitive Behavior" requirements. In this topic, TCC Group's goal is to "require business partners to sign the 'Supplier Code of Conduct' and 'Declaration of Integrity' to commit to comply with all TCC's integrity guidelines" and "set three anti-corruption and anti-bribery policy objectives as the guiding principles for the

organization's integrity management." (TCC Group, 2022b) From the above description, it can be seen that TCC Group established this topic to strengthen cooperation with suppliers and prevent corruption, without a close connection to the social issues. Therefore, it cannot pass the verification of "Societal Problem's Alignment with the Value Chain".

(8) Operational Performance:

This material topic corresponds to "GRI-201 Economic Performance" and is related to TCC Group's actual output and ultimate efficiency, such as "actively deploying globalization, enhancing international reputation; continuously improving productivity, reducing costs; developing market strategies and exploring new markets to maintain industry leadership." (TCC Group, 2022b). Although it is closely related to TCC Group's value chain, it is clearly not established to solve social problems. Therefore, it cannot pass the verification of "Societal Problem's Alignment with the Value Chain".

(9) Risk Management:

This material topic is not a response to any GRI indicators but is a self-defined topic by TCC Group. The goal set by TCC Group in this topic is to establish a "risk management policy and method" and set up a "risk management executive committee under the direct board of directors." (TCC Group, 2022b). By evaluating the likelihood and impact of various risk factors, TCC Group aims to identify the risks that should be actively planned and managed. According to TCC Group's ESG report, the risks here refer to physical risks and transition risks caused by climate change. Physical risks refer to the risks that TCC Group faces due to climate change, such as floods and droughts, while transition risks refer to the risks generated when the government or society requires companies to transition towards a low-carbon direction. TCC Group presents how to manage these risks in this material topic, including organizational and regulatory aspects. Therefore, it is not established to solve social problems but to identify and reduce risks of the TCC Group. Therefore, although Risk Management is related to the value chain, it cannot pass the "Societal Problem's Alignment

with the Value Chain" verification.

(10) Legal Compliance:

This material topic is established to respond to the requirements of "GRI-307 Environmental Compliance" and "GRI-419 Social and Economic Compliance". TCC Group's goals in this topic are to "continuously enhance employees' compliance awareness" and "strengthen the management of missing items through internal audit mechanisms" (TCC Group, 2022b). From these goals, it can be seen that TCC Group is not aiming to solve overall social problems but to strengthen internal controls. Therefore, this topic is not closely related to the social issues and cannot be verified through "Societal Problem's Alignment with the Value Chain".

In summary, only the following four material topics of TCC Group have passed the "Societal Problem's Alignment with the Value Chain" validation as shown in **Figure 16**: (1) Circular Economy, (2) Climate Actions, Sustainable Strategies and Emissions Reduction, (3) Pollution Control and Management, and (4) Biodiversity and Environmental Protection.

Figure 16. "Societal Problem's Alignment with the Value Chain" Validation of Material Topics of TCC Group

Number	Topics focused in this research	Strategic Process	Societal problem's alignment with the value chain		Direct economic profit	CSV or Not
			Societal problem	Alignment with the value chain		
(1)	Circular Economy	O	O	O		
(2)	Climate Actions, Sustainable Strategies and Emissions Reduction	O	O	O		
(3)	Pollution Control and Management	O	O	O		
(4)	Biodiversity and Environmental Protection	O	O	O		
(5)	Human Resources, Workplace Health and Safety	O	X	O		
(6)	Community	X				
(7)	Corporate Governance and Ethical Management	O	X	X		
(8)	Operational Performance	O	X	O		
(9)	Risk Management	O	X	O		
(10)	Legal Compliance	O	X	X		
(11)	Information Disclosure and Transparency	X				
(12)	Product Quality and Product Risk	X				
(13)	Service and Customer Satisfaction	X				
(14)	Supplier Management	X				

4.2.2.2. "Societal Problem's Alignment with the Value Chain" of ACC Group

Unlike TCC Group, ACC Group's core business is relatively simple, which allows this

study to make judgments. According to ACC Group's 2021 annual report, the revenue composition of ACC Group is mainly composed of the production, operation, and sales of cement and clinker (which accounts for 95% of the company's revenue), supplemented by slag powder (which accounts for 5% of the company's revenue). Slag powder is one of the raw materials for precast concrete. After mixing cement and slag powder evenly, it becomes a building material. Therefore, this study judges that ACC Group's revenue comes 100% from the cement industry. As long as a material topic can solve a societal problem and is related to ACC Group's value chain (i.e., the cement industry), this study will judge that the topic passes the verification of "Societal Problem's Alignment with the Value Chain". Next, this study will examine the 11 material topics that have passed the first criterion one by one.

(1) Raw Materials, Wastes and Circular Economy:

This material topic is established to respond to "GRI-301 Materials" and "GRI 306-Waste". In addition, ACC Group has added a self-defined topic "Circular Economy" under this topic. ACC Group uses "external recycled materials", "internal waste", "desulfurization gypsum", and "slag" as cement substitute raw materials (ACC Group, 2022b). In 2021, ACC Group used 285,491 tons of recycled materials, accounting for 4.54% of all raw materials. Currently, ACC Group uses 77 kg of substitute raw materials per ton of cement, and plans to reach 265 kg by 2030 (ACC Group, 2022b). Replacing waste with raw materials to achieve a circular economy can reduce the extraction of natural resources and carbon emissions, which can help solve overall social problems. Moreover, this social problem is closely linked to ACC Group's core business, the cement industry. Therefore, this study judges that "Raw Materials, Wastes and Circular Economy" can pass the "Societal Problem's Alignment with the Value Chain" verification.

(2) Energy:

This material topic is established to respond to "GRI-302 Energy". Similar to TCC Group, ACC Group uses the waste heat generated by the rotary kiln system to produce hot

water, and then generates high-pressure steam through a boiler to provide power for a generator. In 2021, the proportion of ACC Group's waste heat power generation was 24%, which was lower than 28% in 2018 and 26% in 2019, but the same as in 2020 (ACC Group, 2022b). Reducing energy consumption can simultaneously reduce carbon emissions, which can be beneficial for solving overall social problems. Moreover, the cement industry is a high-energy-consuming industry, and the waste heat used by ACC Group comes from the production of cement. Therefore, this study judges that "Energy" can pass the "Societal Problem's Alignment with the Value Chain" verification.

(3) Water Risk:

This material topic is established in response to the requirements of "GRI-303 Water and Effluents". Currently, ACC Group achieves water resource recycling through its self-built wastewater treatment plant, with a current recycling rate of 86% (ACC Group, 2022b). Reducing water resource usage is indeed a major societal issue for water-scarce Taiwan, and the cement industry is a water-intensive industry. Therefore, this study judges that "Water Risk" can pass the verification of "Societal Problem's Alignment with the Value Chain".

(4) Low carbon green manufacturing process and Emissions:

This material topic is established in response to "GRI-305 Emissions". In addition to responding to GRI indicators, ACC Group also includes its self-defined topic, "Low carbon green manufacturing process," under this topic. The ultimate goal of this material topic is to reduce ACC Group's overall carbon emissions. Currently, ACC Group has passed the Science-Based Targets initiative (SBTi) review and set a target to gradually decrease "tonnes CO₂e/tonne clinker" and achieve net zero emissions at its offices and production sites by 2050 (ACC Group, 2022b). Achieving net zero emissions by 2050 is an important goal of the Taiwanese government and the Paris Agreement, and this material topic addresses a significant societal issue. Additionally, cement production is a high-carbon industry, and achieving carbon reduction targets while maintaining cement production is a major challenge

for ACC Group. Therefore, as this material topic both addresses a societal issue and is related to the core value chain, this study judges that "Low carbon green manufacturing process and Emissions" can pass the verification of "Societal Problem's Alignment with the Value Chain".

(5) Legal Compliance:

This material topic is established to respond to "GRI-307 Environmental Compliance". In the corresponding section, ACC Group only discloses environmental penalty events without specific targets. Therefore, this study judges that although ACC Group is related to the value chain in this material topic, it does not attempt to solve any societal problem, and therefore cannot pass the "Societal Problem's Alignment with the Value Chain" verification.

(6) Sustainable mining and sustainable strategy:

As mining for cement raw materials can cause ecological damage to the local area, ACC Group established this material topic to respond to stakeholders. ACC Group promises not to mine in nature reserves and pledges to plant 10 times the number of trees they cut down (ACC Group, 2022b). As this material topic is related to solving significant societal problems and mining for cement raw materials is one of ACC Group's core businesses, this study judges that "Sustainable mining and sustainable strategy" can pass the "Societal Problem's Alignment with the Value Chain" verification.

(7) Sustainable environment education:

This material topic is the same as "Sustainable mining and sustainable strategy" in being a self-defined topic by ACC Group. ACC Group provides free ecological interpretation education in eco-parks and on online platforms to strengthen links with society and solve related societal problems (ACC Group, 2022b). However, this material topic is not directly related to ACC Group's cement industry and cannot pass the "Societal Problem's Alignment with the Value Chain" verification.

(8) Human Resources, Labor/Employer Relationship, Occupational Safety and Health:

This material topic, which encompasses human resources, is a self-defined topic by

ACC Group. ACC Group has set goals such as "maintaining inclusion in the Taiwan Stock Exchange High Salary 100 Index," "employee satisfaction (engagement) of over 70%," "prohibition of child labor and forced labor," and "human rights risk assessment" (ACC Group, 2022b). Although this topic is closely related to social issues, similar to TCC Group, ACC Group has not attempted to solve social problems in the human resources section, but rather responds to the expectations of internal stakeholders (i.e. employees) on this issue. Therefore, although this material topic is closely related to ACC Group's value chain, ACC Group's strategy and efforts are not related to solving social problems, so it cannot pass the "Societal Problem's Alignment with the Value Chain" verification.

(9) Local Community and Rights of Indigenous People:

This topic is developed by ACC Group in response to "GRI-411 Rights of Indigenous Peoples" and "GRI-413 Local Communities." In 1973, ACC Group applied for mining in Hualien Xincheng Mountain, which caused many protests from indigenous peoples that continue to this day (Mirror Media, 2022). Therefore, since the first publication of the ESG report, ACC Group has regarded indigenous peoples' rights as a material topic. ACC Group expresses its concern for the rights of indigenous peoples and local communities in this topic and how to obtain the consent of indigenous peoples to continue mining development. This can be seen as one of ACC Group's efforts to solve social problems. In addition, as ACC Group must obtain important cement raw materials here, if it cannot handle the protests of local indigenous and community residents properly, ACC Group will have difficulty obtaining raw materials, which is also related to ACC Group's value chain. This research determines that "Local Community and Rights of Indigenous People" can pass the "Societal Problem's Alignment with the Value Chain" verification.

(10) Corporate Governance and Economic Performance:

This topic is set up by ACC Group to respond to the general disclosure requirements of GRI 2-9 to 2-21, including governance structure, compensation policy, board selection, and to

respond to the "GRI-201 Economic Performance" topic. In this topic, ACC Group provides basic information required by GRI and discloses the company's profitability. Although it is directly related to ACC Group's core business, it is not a material topic established to solve societal problems. Therefore, this study concludes that "Corporate Governance and Economic Performance" cannot pass the verification of "Societal Problem's Alignment with the Value Chain".

(11) Risk Management and Indirect Economic Impact:

This is an ACC Group's self-defined topic, rather than a response to GRI indicators. Similar to TCC Group, ACC Group also identifies risks that need to be actively planned and managed, including physical and transformational risks caused by climate change. ACC Group presents how to manage these risks in this topic, including organization and regulatory aspects. Therefore, like TCC Group, this topic is not established to solve societal problems, but to identify and reduce risks. Therefore, although "Risk Management and Indirect Economic Impact" is related to the value chain, it cannot pass the verification of "Societal Problem's Alignment with the Value Chain".

As **Figure 17** shows, a total of 6 material topics passed the validation of "Societal Problem's Alignment with the Value Chain," including (1) Raw Materials, Waste and Circular Economy, (2) Energy, (3) Water Risk, (4) Low carbon green manufacturing process and Emissions, (6) Sustainable mining and sustainable strategy, and (9) Local Community and Rights of Indigenous People. In the next section, this study will validate whether the 10 material topics of TCC Group and ACC Group that passed "Societal Problem's Alignment with the Value Chain" have produced direct economic profit (i.e., the third criterion of Menghwar and Daood (2021)) to evaluate whether the ESG actions of TCC Group and ACC Group are consistent with CSV.

Figure 17. "Societal Problem's Alignment with the Value Chain" Validation of Material

Topics of ACC Group

Number	Topics focused in this research	Strategic Process	Societal problem's alignment with the value chain		Direct economic profit	CSV or Not
			Societal problem	Alignment with the value chain		
(1)	Raw Materials, Wastes and Circular Economy	O	O	O		
(2)	Energy	O	O	O		
(3)	Water Risk	O	O	O		
(4)	Low carbon green manufacturing process and Emissions	O	O	O		
(5)	Legal Compliance	O	X	O		
(6)	Sustainable mining and sustainable strategy	O	O	O		
(7)	Sustainable environment education	O	O	X		
(8)	Human Resources , Labor/ Employer relationship, Occupational Safety and Health	O	X	X		
(9)	Local Community and Rights of Indigenous People	O	O	O		
(10)	Corporate Governance and Economic Performance	O	X	O		
(11)	Risk Management and Indirect Economic Impact	O	X	O		
(12)	Market Status, Image and communication	X				
(13)	Transportation	X				
(14)	Grievance mechanism for environmental issues	X				
(15)	Anti-corruption	X				
(16)	Anti-competitive behavior	X				
(17)	Customer Health, Safety and privacy	X				

4.2.3. "Direct Economic Profit"

According to the definition by Menghwar and Daood (2021), "Direct Economic Profit" can refer to cost savings or direct profit generation. However, it is important to note the "Direct" aspect - for example, intangible assets such as goodwill obtained through a company's actions cannot be considered "Direct Economic Profit" (Menghwar and Daood, 2021). Therefore, this study will use this perspective to examine whether the ESG actions of TCC Group and ACC Group, as reflected in their annual reports and ESG reports, result in cost savings or increased profit, and if so, to what extent.

4.2.3.1. "Direct Economic Profit" of material topics of TCC Group

(1) Circular Economy:

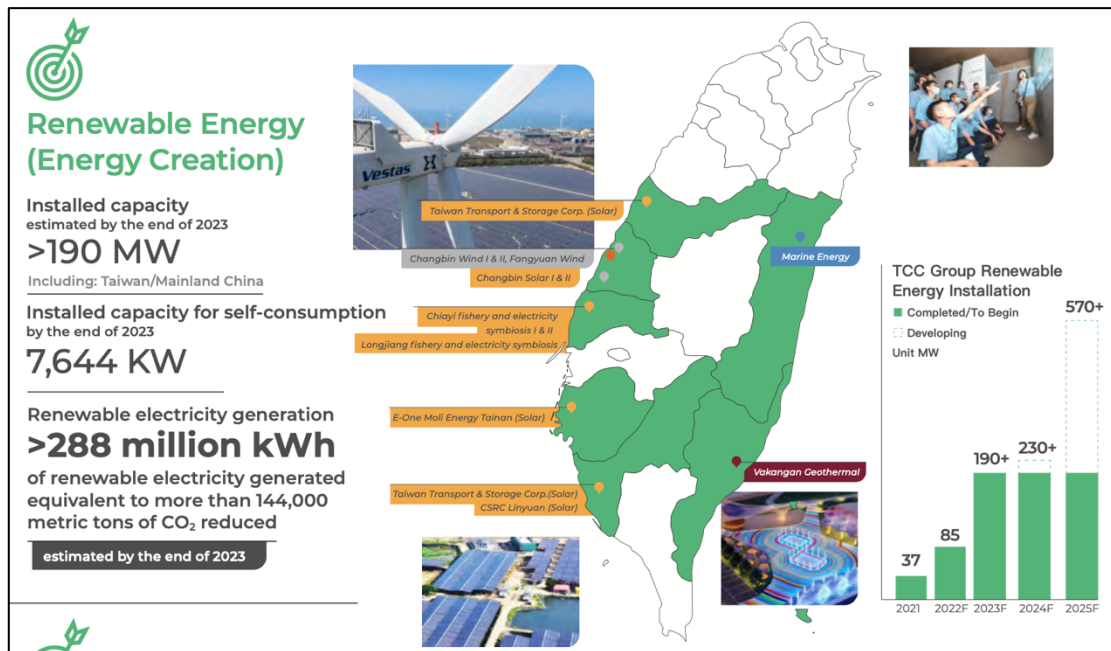
This section aims to investigate whether the "Resource Recycling" and "Green Energy" aspects of TCC Group's core businesses have received direct economic benefits. Regarding "Resource Recycling," this study will explore the effectiveness of TCC Group's reuse of waste and waste heat. The World Business Council for Sustainable Development (WBCSD)

has indicated that co-processing in the cement industry is the most scientific, safe, and effective method for handling waste, as it mimics the natural cycle of regeneration (TCC Group, 2022b). TCC Group extends the unique advantages of the cement industry to a circular production model. By utilizing the properties of high temperature, high turbulence, and high retention time in the cement kiln, TCC Group can decompose dioxins that cannot be treated by incinerators, rendering most waste "harmless and resourceful" (TCC Group, 2022b). TCC Group assists ten major industries, including power, construction, steel, semiconductor manufacturing, semiconductor packaging, chemical fibers, paper, waste incinerators, environmental recycling, and water treatment plants, in dealing with waste that they cannot handle on their own, using it as cement substitutes and fuel (TCC Group, 2022b). Moreover, as TCC Group operates its power plants, the coal ash produced can serve as a cement substitute material, and desulfurized gypsum can serve as a cement substitute aid, reducing 755,000 tons of waste alone. These wastes also enable TCC Group's cement division to reduce the amount of raw material purchased, further reducing costs. Overall, in 2021, TCC Group assisted Taiwanese companies in disposing of a total of 1.141 million tons of waste, which, according to Environmental Protection Administration statistics, is equivalent to 5.5% of Taiwan's overall business waste (TCC Group, 2022b). This translates to a reuse rate of 218.2kg of cement per ton, reducing 72,841.1 tons of carbon dioxide emissions, a 35.1% growth in reuse rate compared to 2016, when 177.1kg of cement was reused per ton (TCC Group, 2022b). If TCC Group's cement production in 2021 is calculated as 50.479 million tons, 11,014.5 thousand tons came from waste, equivalent to a saved production value of NT\$ 16.2 billion (TCC Group, 2022b). During the process of manufacturing cement and burning waste, heat energy is generated, which TCC Group also reuses for residual heat power generation. Currently, all of TCC Group's cement plants have residual heat power generation systems, and TCC Group's residual heat power generation in 2021 reached 138.257 million kWh, equivalent to a 31% reduction in purchased electricity in 2021. If

calculated at an average electricity price of NT\$ 5.74 per kWh for large factories in Taiwan, TCC Group has saved NT\$ 793.59 million in electricity costs annually (TCC Group, 2022b). TCC Group plans to invest NT\$ 406 million in improving residual heat power generation systems in 2021, with an expected increase in net power generation per ton of clinker from 13 kWh to 29 kWh, doubling the power generation efficiency (TCC Group, 2022b). In this section, we can clearly see the direct economic benefits generated by TCC Group through "Resource Recycling."

Regarding the "Green Energy" aspect, TCC Group entered the energy industry at an early stage by establishing EnergyTrend Technology in 1998 to research and develop rechargeable lithium-ion and branded battery core manufacturing (TCC Group, 2017). In 2018, TCC Group established its wholly-owned subsidiary, Taiwan Cement Green Energy, to actively engage in green energy development (TCC Group, 2018). In 2019, Taiwan Cement Green Energy built Taiwan's first large-scale wind and solar hybrid power plant and applied to establish Taiwan's first large-scale fishery and electricity co-generation zone (TCC Group, 2019). In 2020, it launched Taiwan's first large-scale energy storage automatic frequency control (AFC) for standby support services (TCC Group, 2020). As shown in **Figure 18**, TCC Group's renewable energy capacity will exceed 190MW, renewable energy generation will exceed 288 million kWh, and over 144,000 tons of carbon dioxide emissions will be reduced by the end of 2023 (TCC Group, 2022b).

Figure 18. Renewable Energy Creation of TCC Group (TCC Group, 2022b)



In recent years, TCC Group's most significant decision in the green energy field was the acquisition of a 60.48% stake in the European Engie EPS energy storage company for 132 million euros (about NT\$4.47 billion at the time) in July 2021, renamed NHOA (New Horizons Ahead) (Yuan, 2023a). NHOA has operations in Europe, the Americas, Oceania, and Africa, and holds various patents and products in advanced BESS (battery energy storage systems), electric vehicle fast charging, smart grids, and hydrogen energy. The main reason for TCC Group's acquisition of NHOA is that "without energy storage, intermittent solar and wind power cannot completely replace fossil fuels, and net-zero carbon emissions cannot be achieved" (TCC Group, 2022b). As TCC Group's acquisition of NHOA was completed in 2021, revenue and profits will be reported in the 2022 annual report, and this study cannot confirm whether NHOA has generated direct economic profit. However, TCC Group continues to hold corporate briefings and accepts interviews with multiple media outlets. This study confirms TCC Group's profit in the energy storage industry through these channels. According to TCC Group, the proportion of non-cement revenue in its consolidated revenue has increased from 16% in 2021 to 32% in 2022, with a target of increasing to 50% in 2025

(Yuan, 2023a). In addition to the revenue ratio, revenue and profits from the power and energy sectors have also increased (Yuan, 2023a). From these data, TCC Group also has significant direct economic profit in the green energy sector.

As both "Resource Recycling" and "Green Energy" have direct economic profit, this study concludes that Circular Economy meets the three criteria for CSV as defined by Menghwar and Daood (2021).

(2) Climate Actions, Sustainable Strategies and Emissions Reduction:

This section focuses on whether TCC Group's "Low-Carbon Cement" and carbon capture technology have resulted in direct economic benefits for the company. In terms of "Low-Carbon Cement," TCC Group has actively pursued carbon labeling and carbon reduction certification for its cement products. In 2021, the Suao plant reduced its carbon footprint by 11%, and the Heping plant reduced its carbon footprint by 5.5%, meeting Taiwan EPA's 3% standard and obtaining carbon reduction label certification (TCC Group, 2022b). According to TCC Group's 2021 TCFD report, these carbon reduction efforts are mainly due to the purchase of energy-saving and carbon-reducing equipment and process improvements. However, TCC Group has not disclosed whether producing cement using low-carbon methods has resulted in direct economic benefits (TCC Group, 2022c). Therefore, this study can only discuss this issue indirectly and through inference.

According to TCC Group's TCFD report, "smart low-carbon production" and participation in the carbon trading and renewable energy markets, as well as "differentiation to enhance competitiveness," are opportunities arising from the company's investments in low-carbon technology, equipment, and management costs, and from the carbon trading, carbon fees, and carbon tax systems (TCC Group, 2022c). Indeed, TCC Group's low-carbon production can allow more ESG-focused construction companies to choose TCC Group's cement over other companies' products, making TCC Group more competitive. However, this "competitiveness" cannot be directly measured in terms of economic benefits. Additionally, if

TCC Group continues to reduce its carbon emissions, it could be seen as a source of profit in the future carbon credit trading market. However, given that Taiwan's carbon credit trading market has not yet been established, it is difficult to accurately measure whether TCC Group can gain actual economic benefits from this area.

Therefore, TCC Group is unable to obtain direct economic profit in the "Low-Carbon Cement" part at this stage. Still, this study believes that TCC Group is likely to differentiate itself in this area in the future to enhance its competitiveness. This issue will be discussed further in the Discussion chapter.

TCC Group has been promoting carbon capture technology since its earliest ESG report in 2010, and it has continued to appear in the company's annual ESG reports (TCC Group, 2014-2021). According to TCC Group's 2018 ESG report, the company has been cooperating with the Industrial Technology Research Institute of Taiwan since 2011 to promote "pilot system technology cooperation research for calcium loop carbon capture" and "verification and amplification of carbon capture and utilization technology research and development" (TCC Group, 2018). As shown in **Figure 19**, using limestone, a raw material in cement production, as an adsorbent, TCC Group has effectively captured and separated CO₂ from flue gas by taking advantage of its low cost, high adsorption capacity, and easy availability. Additionally, the adsorbents that have lost their activity can be reused as raw materials in the cement production process or to produce higher-value lightweight calcium carbonate. This is a win-win strategy for TCC Group's cement division, as it not only reduces CO₂ emissions but also lowers the cost of cement production. TCC Group has also developed a "microalgae carbon fixation technology" to utilize the captured CO₂. The company has selected microalgae, which can fix carbon dioxide tens of times faster than trees, as the cultivation target (TCC Group, 2018). After purifying the CO₂, it is used as the carbon source for microalgae, which are then refined into bioenergy for use in the cement industry. In other words, the raw materials of cement can be used as adsorbents for carbon capture technology,

and the captured CO₂ can be used to cultivate microalgae, which can be refined into bioenergy to supply the cement industry, forming a positive cycle. It is expected to capture 100,000 tons of CO₂ per year by 2030 and 1.6 million tons of CO₂ per year by 2050 (TCC Group, 2018).

Figure 19. Carbon Capture Technology of TCC Group



However, similar to the "Low-Carbon Cement" section, this study cannot directly verify whether carbon capture technology generates direct economic profit. The latest effectiveness data on carbon capture technology provided by TCC Group was in the 2018 ESG report, which mentioned that TCC Group captured 355 tons of carbon dioxide, which is still far from the goal of capturing 100,000 tons per year. However, as TCC Group's carbon capture pilot plant is the largest in Asia, this study believes that when carbon trading becomes more active and benefits can be quantified in the future, carbon capture technology may bring direct economic profit to TCC Group.

In summary, this study cannot clearly demonstrate whether "Climate Actions,

Sustainable Strategies and Emissions Reduction" can bring direct economic profit, but according to TCC Group's ESG report, these strategies and actions have strengthened competitiveness and have insights in carbon trading. This study concludes that "Climate Actions, Sustainable Strategies and Emissions Reduction" may not necessarily meet the three criteria proposed by Menghwar and Daood (2021) and belongs to a fuzzy area in CSV, which requires further discussion in the Discussion section.

(3) Pollution Control and Management:

This section represents TCC Group's efforts in reducing waste gas and water resource usage.

In terms of air emissions, TCC Group's self-imposed standards are even stricter than government emission standards (TCC Group, 2022b). Through equipment modification, sealed conveyor belts, and nitrogen oxide control technology, TCC Group systematically manages air emissions. In 2021, NO_x, SO_x, TSP, and dioxin emissions were far below government standards (TCC Group, 2022b). Being able to emit clean air is good for both TCC Group and society, but it cannot bring direct economic benefits to TCC Group. TCC Group also does not describe in its annual reports or ESG reports the direct economic benefits of reducing waste gas emissions.

In terms of water resource management, TCC Group invested NT\$380 million in its water resource management system from 2020 to 2022, resulting in a total water saving of 246,841 tons (TCC Group, 2022b). If calculated based on an average cost of NT\$12 per ton of water, TCC Group has saved less than NT\$3 million in water costs. Therefore, although TCC Group has saved precious water resources for water-scarce Taiwan in terms of water resource management, it has not generated direct economic profit for itself.

In summary, although TCC Group has solved many social problems in "Pollution Control and Management" and is closely related to the value chain, it has not generated direct economic profit. This study concludes that "Pollution Control and Management" cannot pass

the three criteria of Menghwar and Daood (2021) and is not included in CSV.

(4) Biodiversity and Environmental Protection:

TCC Group has made remarkable achievements in biodiversity and environmental protection. The company has developed biodiversity plans for all of its mining areas in Taiwan and has signed a no-deforestation policy. Currently, TCC Group has conserved 34,046 endangered species and restored 88% of native plant species in specific mining areas (TCC Group, 2022b). Since the establishment of the Gu Jen-Chau Yun Plant Conservation Center in 2007, TCC Group has become the most important tropical and subtropical plant conservation center in the world, with 8,709 species and 62,037 liquid nitrogen frozen specimens (TCC Group, 2022b). However, these actions in biodiversity and environmental protection have not brought direct economic profit to TCC Group. For example, opening the ecological park to the public for free and implementing policies such as no-deforestation cannot directly benefit TCC Group economically. Nonetheless, TCC Group's actions have undoubtedly preserved valuable endemic plant species in Taiwan and addressed social issues. Additionally, these policies are directly related to TCC Group's cement production and have a close link to the value chain.

However, since they cannot generate direct economic profit, this study judges that Biodiversity and Environmental Protection cannot pass the three criteria of Menghwar and Daood (2021) and does not belong to CSV.

In summary, as illustrated in **Figure 20**, among TCC Group's (1) Circular Economy, (2) Climate Actions, Sustainable Strategies and Emissions Reduction, (3) Pollution Control and Management, and (4) Biodiversity and Environmental Protection, only (1) Circular Economy can generate direct economic profit, which falls within the scope of CSV. Although (2) Climate Actions, Sustainable Strategies and Emissions Reduction can serve as a long-term strategy, address societal problems, and be relevant to the value chain, the benefits generated are ambiguous and uncertain. This research is marked with a triangle (Δ) in **Figure 20** and

requires further discussion in a dedicated chapter. On the other hand, (3) Pollution Control and Management and (4) Biodiversity and Environmental Protection can also address societal problems and be relevant to the value chain but cannot bring profits to TCC Group, hence not falling within the scope of CSV.

Figure 20. “Direct Economic Profit” Validation of Material Topics of TCC Group

Number	Topics focused in this research	Strategic Process	Societal problem's alignment with the value chain		Direct economic profit	CSV or Not
			Societal problem	Alignment with the value chain		
(1)	Circular Economy	O	O	O	O	O
(2)	Climate Actions, Sustainable Strategies and Emissions Reduction	O	O	O	△	△
(3)	Pollution Control and Management	O	O	O	X	X
(4)	Biodiversity and Environmental Protection	O	O	O	X	X
(5)	Human Resources, Workplace Health and Safety	O	X	O		
(6)	Community	X				
(7)	Corporate Governance and Ethical Management	O	X	X		
(8)	Operational Performance	O	X	O		
(9)	Risk Management	O	X	O		
(10)	Legal Compliance	O	X	X		
(11)	Information Disclosure and Transparency	X				
(12)	Product Quality and Product Risk	X				
(13)	Service and Customer Satisfaction	X				
(14)	Supplier Management	X				

4.2.3.2. “Direct Economic Profit” of material topics of ACC Group

(1) Raw Materials, Waste and Circular Economy:

Similar to TCC Group, ACC Group also utilizes the unique advantages of the cement industry to extend the circular production model, using the high temperature of over 1,300 degrees in the cement kiln to treat waste and turn it into alternative raw materials for cement production. According to ACC Group's ESG report, the group uses external waste, internal waste (refractory bricks, etc.), desulfurization gypsum, slag, and fly ash as alternative raw materials for cement. However, ACC Group's performance in the circular economy is significantly worse than that of TCC Group. In 2021, ACC Group only used 77 kilograms of alternative raw materials per ton of cement, replacing a total of 285,491 tons of raw materials. It is expected to reach 234 kilograms of raw material replacement per ton of cement by 2025 and 265 kilograms by 2030 (ACC Group, 2022b). However, TCC Group has already reached the level of replacing 218 kilograms of raw materials per ton of cement in 2021, not far from

ACC Group's 2025 goal. Although ACC Group's efficiency in the circular economy is not as good as that of TCC Group, it still generates direct economic benefits for ACC Group. ACC Group produced a total of 31,104 thousand tons of cement and a production value of NT\$549.85 billion in 2021, saving NT\$4.233 billion through the circular economy (ACC Group, 2022b). This study concludes that TCC Group has a significant direct economic profit in Raw Materials, Waste and Circular Economy, and therefore passes all three criteria of Menghwar and Daood (2021) and belongs to CSV.

(2) Energy:

In terms of energy, ACC Group, like TCC Group, also utilizes waste heat for power generation. In 2021, ACC Group generated 75,876 MWh of electricity through waste heat, which is equivalent to 24% of its purchased electricity (ACC Group, 2022b). It is worth noting that TCC Group generated 138.257 GWh of electricity through waste heat, which is equivalent to a 31% reduction in purchased electricity in 2021 (TCC Group, 2022b). However, the performance of ACC Group's waste heat power generation has been declining, with waste heat power generation accounting for 28% of purchased electricity in 2018, 26% in 2019, and 24% in 2020 and 2021 (TCC Group, 2022b). Although the performance is not outstanding, it cannot be denied that ACC Group's waste heat power generation still saved the company NTD 435.53 million in electricity costs (TCC Group, 2022b). However, unlike TCC Group, ACC Group has not entered the green energy industry. Therefore, this study only analyzed the waste heat power generation of ACC Group in the "Energy" section, and did not cover other aspects. This study concludes that ACC Group has a significant direct economic profit in the Energy category and meets the three criteria of Menghwar and Daood (2021), making it part of the CSV.

(3) Water Risk:

ACC Group has also invested in water recycling, but the amount of investment in water-saving equipment cannot be obtained from the group's ESG report or annual report. However,

this study still evaluates the water-saving performance of ACC Group and TCC Group through water use intensity. TCC Group had a water use intensity of 0.0003 million liters/ton of cementitious material in 2021, which means 0.3 tons of water is used per ton of cementitious material produced (TCC Group, 2022b). In 2017, ACC Group's water use intensity was 0.713 tons of water used per ton of cementitious material produced, which had decreased to 0.668 in 2021 (ACC Group, 2022b), although it still cannot surpass TCC Group's performance. Since TCC Group's outstanding water-saving efficiency cannot generate direct economic profit, this study also concludes that it is difficult for ACC Group to obtain higher benefits from reducing water use than investing in equipment. Therefore, this study determines that ACC Group does not have direct economic profit in Water Risk and cannot pass the three criteria of Menghwar and Daood (2021), and therefore is not considered a CSV.

(4) Low carbon green manufacturing process and Emissions:

ACC Group has been implementing its "Cement 4.0" smart manufacturing program since 2016, reducing carbon dioxide emissions during cement production through the use of alternative materials and fuels (ACC Group, 2016). In addition, ACC Group has formulated a science-based carbon reduction plan, aiming to reduce carbon dioxide emissions per ton of cement from 0.852 tons in 2021 to 0.807 tons by 2025 (ACC Group, 2022b). However, compared to TCC Group, ACC Group's low-carbon manufacturing still needs improvement. TCC Group had already achieved a carbon dioxide emissions level of 0.806 tons per ton of cement in 2021 (TCC Group, 2022b), which is lower than ACC Group's projected value for 2025. Additionally, ACC Group disclosed in its ESG report that the cost of low-carbon investment is NT\$2.71 billion (ACC Group, 2022b). However, as discussed in the relevant section on TCC Group, it is still unclear what direct economic benefits carbon reduction brings to businesses. ACC Group's carbon reduction performance is inferior to TCC Group's, making it even more difficult to profit from it. Therefore, this study judges that ACC Group

does not have direct economic profit in Low carbon green manufacturing process and Emissions and cannot meet the three criteria of Menghwar and Daood (2021) to be classified as a CSV.

(6) Sustainable mining and sustainable strategy:

ACC Group, like TCC Group, also actively takes measures to protect biodiversity. ACC Group has signed a no-deforestation policy and invested in the restoration of native tree species, while also paying attention to the impact of cement production on the local environment (ACC Group, 2022b). Currently, ACC Group has invested approximately NT\$4.7 million in periodic monitoring and evaluation of blasting vibrations and slope stability, and has also invested approximately NT\$10.24 million in vegetation greening (ACC Group, 2022b). However, similar to the analysis of TCC Group, promoting measures related to biodiversity conservation does alleviate the ecological damage caused by cement production, but it cannot bring clear profits to the company. Therefore, this study concludes that ACC Group does not have direct economic profit in Sustainable mining and sustainable strategy and cannot pass the three criteria of Menghwar and Daood (2021) to be considered as CSV.

(9) Local Community and Rights of Indigenous People:

ACC Group began mining cement in the Hualien Xincheng mining area in 1957 and has faced continuous opposition from local indigenous peoples and residents. Indigenous groups established the "Anti-ACC Group Return Our Land Self-Rescue Association" to fight for their rights through protests and lawsuits (The News Lens, 2022). In 1997, the Control Yuan investigation found that there was obvious administrative negligence in the acquisition of land in the Xincheng Mountain mine (The News Lens, 2022). Even in 2021, when ACC Group tried to extend its mining rights, the Supreme Administrative Court ruled that the mining rights were revoked because the company did not follow the consultation and consent procedures of the Indigenous Basic Law (The News Lens, 2022). This posed a great crisis for

ACC Group, as it was related to the production of cement raw materials, which is crucial to the company.

On February 12, 2022, ACC Group held a consultation and consent vote with the local indigenous community. A total of 353 households voted, with a turnout rate of 64%, and 294 votes in favor, 45 votes against, and 14 invalid votes. In other words, 83% of households in the tribe supported ACC Group to continue mining in the area. The tribal meeting approved the 10+11 benefit sharing mechanism, which includes the "existing" 10 feedback items proposed by Asia Cement and "additional" 11 feedback items (ACC Group, 2022b).

Regarding the benefits, ACC Group has paid a huge cost to continue mining cement raw materials in the area. The cost is not only compensation paid to local indigenous peoples, but also a great damage to the company's reputation. However, there have been many reports indicating that ACC Group guided the vote in an improper way, and even violent conflicts erupted during the vote (Yin, 2022, Limadjakan, 2022). All of this has had an impact on the legitimacy of ACC Group's mining in the area.

In summary, ACC Group has indeed paid a lot of costs and efforts for the local community and indigenous peoples, but the damage to the company itself, especially to its reputation, is incalculable. This study concludes that ACC Group does not have direct economic profit in Local Community and Rights of Indigenous People and therefore cannot pass the three criteria of Menghwar and Daood (2021) to be considered CSV.

As shown in **Figure 21**, ACC Group has validated the first two material topics, namely (1) Raw Materials, Wastes and Circular Economy and (2) Energy, among (3) Water Risk, (4) Low Carbon Green Manufacturing Process and Emissions, (6) Sustainable Mining and Sustainable Strategy, and (9) Local Community and Rights of Indigenous People. Only (1) Raw Materials, Wastes and Circular Economy and (2) Energy can generate direct economic profit. This study will compare the material topics that have been validated by Creating Shared Value (CSV) for TCC Group and ACC Group in the following chapters.

Figure 21. “Direct Economic Profit” Validation of Material Topics of ACC Group

Number	Topics focused in this research	Strategic Process	Societal problem's alignment with the value chain		Direct economic profit	CSV or Not
			Societal problem	Alignment with the value chain		
(1)	Raw Materials, Wastes and Circular Economy	O	O	O	O	O
(2)	Energy	O	O	O	O	O
(3)	Water Risk	O	O	O	X	X
(4)	Low carbon green manufacturing process and Emissions	O	O	O	X	X
(5)	Legal Compliance	O	X	O		
(6)	Sustainable mining and sustainable strategy	O	O	O	X	X
(7)	Sustainable environment education	O	O	X		
(8)	Human Resources , Labor/ Employer relationship, Occupational Safety and Health	O	X	X		
(9)	Local Community and Rights of Indigenous People	O	O	O	X	X
(10)	Corporate Governance and Economic Performance	O	X	O		
(11)	Risk Management and Indirect Economic Impact	O	X	O		
(12)	Market Status, Image and communication	X				
(13)	Transportation	X				
(14)	Grievance mechanism for environmental issues	X				
(15)	Anti-corruption	X				
(16)	Anti-competitive behavior	X				
(17)	Customer Health, Safety and privacy	X				

4.2.4. Comparison between CSV of TCC Group and ACC Group

Based on the above analysis, this study identifies that TCC Group belongs to CSV in the aspect of "Circular Economy," while in the aspect of "Climate Actions, Sustainable Strategies and Emissions Reduction," it is classified as ambiguous because it has not been determined whether direct economic profit is generated. As for ACC Group, it belongs to CSV in the material topics of "Raw Materials, Wastes and Circular Economy" and "Energy." However, this study cannot judge that ACC Group's ESG actions are better than TCC Group's simply because it has two CSV aspects, but rather must carefully examine the implications behind these two aspects.

The "Circular Economy" and "Climate Actions, Sustainable Strategies and Emissions Reduction" of TCC Group, as well as the "Raw Materials, Wastes and Circular Economy" and "Energy" of ACC Group, actually mean the investment in recycled raw materials and fuels in the cement industry. This kind of action that is closely related to the value chain can not only solve social problems, including reducing the use of raw materials and fuels, and reducing carbon emissions, but also bring actual profits to companies in the cement industry. However, although this kind of action comes from the characteristics of the cement industry itself, there

are fundamental differences between TCC Group and ACC Group in the following aspects, which lead to different degrees of benefits in CSV for TCC Group and ACC Group.

(1) TCC Group's efficiency is significantly better than ACC Group:

TCC Group performs significantly better than ACC Group in terms of environmental-friendly processes. This study summarizes the environmental-friendly processes related outcomes of TCC Group and ACC Group in **Table 5**. Firstly, in terms of recycled materials in circular economy, although both companies use recycled materials to reduce production costs, TCC Group uses a recycled material density that is 283.37% higher than ACC Group's, resulting in nearly four times the value created. In terms of waste heat power generation, TCC Group substitutes 31% of purchased external power with waste heat power generation, which is 7 percentage points higher than ACC Group and saves 82% of electricity costs. TCC Group also uses less water on average than ACC Group. In addition, TCC Group's carbon dioxide emission density is about 5.4% lower than that of ACC Group. From these key indicators, although both TCC Group and ACC Group can benefit themselves while solving social problems, TCC Group's gains from these ESG activities are significantly better than those of ACC Group.

Table 5. Summary of the Environmental-friendly Processes Related Outcomes of TCC Group and ACC Group (TCC Group, 2021. ACC Group, 2021)

	TCC Group	ACC Group
Each ton of cement using recycled materials	218.2 kg	77 kg
Value generated from recycled materials used	NTD 162 billion	NTD 42.33 billion
Proportion of purchased electricity replaced by waste heat power generation	31%	24%
Value generated from waste heat power generation	NTD 793.59 million	NTD 435.53 million

Water intensity (amount of water used per ton of cement produced)	0.3 ton	0.668 ton
Carbon dioxide intensity (amount of carbon dioxide emitted per ton of cement produced)	0.806 ton	0.852n

(2) TCC Group's foray into the energy and energy storage business:

TCC Group's move into the energy and energy storage business has fundamentally differentiated its performance in CSV from that of ACC Group. While ACC Group remains Taiwan's second-largest cement company and a fully cement-focused company, TCC Group has taken a completely different path, with energy and energy storage as the main engine of its future development. TCC Group's non-cement industry revenue has already exceeded 30%, indicating that TCC Group is not just using energy and energy storage as a buzzword, but has indeed created revenue and profits for TCC Group in these industries (Yuan, 2023b). In its 2021 annual report, TCC Group pointed out that Taiwan's cement industry has matured and is saturated, and the future goal is to maintain market share (TCC Group, 2022b). Although TCC Group already has many cement industry layouts in mainland China, and is the seventh-largest cement manufacturer in mainland China, and has cement production layouts in Turkey, Cameroon, Ivory Coast, and other places, this is no longer the core of TCC Group's future. According to the chairman of TCC Group in an interview, "The reduction of cement production and usage is not a bad thing. Some things do not need to grow, some need to be optimized and used more efficiently. TCC Group hopes that 50% of its revenue will come from the cement industry and 50% from non-cement industries in the future" (Hsieh, 2022). This shows TCC Group's ambition and strategy in this area. In contrast, ACC Group still maintains 100% revenue from its cement business, and the shrinking cement market may pose a threat to ACC Group. Moreover, ACC Group's performance in low-carbon production, energy saving, and material conservation is worse than TCC Group, which may pose more

challenges for ACC Group in the future. Especially when customers who purchase cement are more concerned about low-carbon production and clean materials issues, and even Taiwan and mainland China begin to levy carbon taxes, it will make ACC Group's cement face greater competition.

(3) TCC Group's Carbon Capture Technology:

Carbon capture technology is another area that TCC Group has entered but ACC Group has not. Although TCC Group has not yet directly benefited economically from carbon capture technology, it can strengthen the practice of circular economy through it. For example, TCC Group can use carbon captured through this technology to cultivate algae, which can be turned into bioenergy, further reducing TCC Group's energy consumption. This study sees the potential of TCC Group's carbon capture technology in contributing to its future revenue and profitability, and believes that this will make TCC Group's future CSV actions even more diversified.

(4) ACC Group's excessive costs in "Local Community and Rights of Indigenous People":

ACC Group has spent too much cost on this material topic, and it may not effectively solve social problems. Even though ACC Group has made several formal statements on relevant issues and disclosed compensations to indigenous people and local residents in its ESG report, local residents and public opinion are still unfriendly towards ACC Group. In this situation, the costs spent by ACC Group not only cannot solve social problems but also cannot bring benefits to itself, which has a significant negative impact on ACC Group's future development.

4.2.5. Summary of Validation of Hypothesis 2: If two companies with similar business bases and levels of business performance do not have similar ESG performance, CSV may be one of the key influencing mechanisms.

This chapter of the study evaluates whether the ESG actions of TCC Group and ACC

Group belong to CSV and finds that their actions in the areas of circular economy and energy are both classified as CSV, with TCC Group outperforming ACC Group. This is reflected in TCC Group's ability to create profits for the company and effectively solve social issues compared to ACC Group's actions. This leads to a better ESG performance for TCC Group. Based on this analysis, even though TCC Group and ACC Group are two companies with similar business bases and levels of business performance, the difference in the degree of CSV leads to differences in their ESG performance.

Chapter V. Discussion

In the Results section, this study evaluated the ESG practices of TCC Group and ACC Group, and found that both companies have CSV practices in the areas of energy and circular economy. However, TCC Group performed better than ACC Group in terms of addressing social issues and creating direct economic benefits, while ACC Group incurred more costs on indigenous peoples' issues. Therefore, this study judged that TCC Group has a better CSV performance than ACC Group, leading to better overall ESG performance. In the following sections, this study will discuss the findings and potential criticisms of the process used to reach these conclusions.

5.1. How to define TCC Group's core industry?

Menghwar and Daood (2021) proposed three indicators for CSV, one of which is "Societal Problem's Alignment with the Value Chain." For ACC Group, the value chain undoubtedly includes all production activities related to the cement industry, and there is no controversy about this. However, for TCC Group, this study judges its core industries to be the cement and energy industries. The question that this study must answer is whether this judgment will affect the research results.

The reason why this study includes the energy industry as part of TCC Group is based on "TCC Group's current and future revenue composition" and "the correlation between the cement and energy industries."

5.1.1. TCC Group's current and future revenue composition

According to TCC Group's 2021 annual report, the company generated 12.65% of its revenue from the energy sector in 2021, a significant percentage that cannot be ignored (TCC Group, 2022a). In the annual report, TCC Group discussed the cement and energy industries in equal measure in industry analysis, market analysis, and technological improvement

analysis, indicating the importance of the energy sector to the company. TCC Group is gradually transforming from a pure cement company to a diversified company that emphasizes both cement and energy. Although the 2022 annual report has not yet been released, according to other official data released by TCC Group, non-cement industries already accounted for 32% of the company's total revenue in 2022, and the company aims to increase this to 50% by 2025 (Economic Daily News, 2023). Based on these data, this study believes that the green energy and energy storage industry is indeed one of TCC Group's core industries.

5.1.2. The relationship between the cement and energy industries

In addition to being an important source of revenue and profit for TCC Group, the energy industry itself is also related to the cement industry, making it strategically important for TCC Group to enter this field. TCC Group's energy industry is mainly composed of green energy and energy storage businesses. In terms of green energy, TCC Group currently has 7,644 KW of electricity generated and used in-house, with an installation capacity of 190 MW in Taiwan and mainland China (TCC Group, 2022b). Since cement is a high-energy-consuming industry and TCC Group has declared its goal of achieving net-zero emissions by 2050, with 16% coming from renewable energy, this study believes that the energy industry is closely related to the cement industry and complements it (TCC Group, 2022b).

5.2. TCC Group's CSV performance is better than ACC Group's, but there is no difference in profitability.

In verifying the main finding of this study, which is "There is a significant difference in ESG performance among firms with similar business bases and levels of business performance," this study used ROE and ROA as one of the data points to verify the similarity between the two companies. However, one of the criteria for CSV is "direct economic profit," which may lead to a logical flaw in this study's conclusion, namely, "if CSV can generate

direct economic benefits and TCC Group's CSV performance is better than ACC Group's, why isn't there a gap between TCC Group's ROE and ROA data and ACC Group's ROE and ROA?"

5.2.1. CSV not only emphasizes economic benefits

The first reason is based on the definition of CSV itself. According to the three criteria proposed by Menghwar and Daood (2021), a company's ESG performance must be a long-term strategy, align with societal problems in the value chain, and generate direct economic benefits in order to be considered CSV. Based on the results of this study, both TCC Group and ACC Group can be considered CSV in the material topics of energy and circular economy, but the degree of TCC Group is deeper. This deeper degree is not only reflected in more direct economic benefits, but also in solving more societal problems. Therefore, although the CSV level of TCC Group is deeper, it has not resulted in a significant difference in profitability compared to ACC Group.

5.2.2. TCC Group's entry into the energy industry, but the proportion is still not high

The second reason is that the benefits of TCC Group's entry into the energy industry have not yet fully manifested. TCC Group only officially acquired 60.48% of Engie EPS, a European energy storage company, and renamed it NHOA (New Horizons Ahead), in July 2021. The scope of this study is ESG reports and annual reports from 2013 to 2021, and the official annual report for 2022 has not yet been released, so this study cannot clearly define how much profit TCC Group has gained from its energy business.

However, based on various interviews with TCC Group, it can be seen that the proportion of TCC Group's energy business is gradually increasing, while the cement division has not declined significantly, indicating that TCC Group's investment in the energy sector is gradually paying off. If this aspect of the data is taken into account, perhaps TCC Group can have more harvest in the "direct economic profit" aspect, which will make the ROE and ROA

performance significantly different from ACC Group's ROE and ROA performance. However, more years of data are needed to support this, which also leaves room for future research.

5.2.3. The High Concentration of Revenue in Mainland China for Both Companies

One possible reason for the differing CSV performance and similar profitability between TCC Group and ACC Group is the high concentration of their revenue sources in mainland China. This study utilizes the ESG reports of TCC Group and ACC Group, which are primarily compiled to comply with the regulatory requirements of the Taiwanese government. However, in 2021, TCC Group generated 88.25% of its revenue from mainland China, while ACC Group generated 89.00% of its revenue from the same source. This high concentration of revenue from mainland China may have decoupled the relationship between their ESG actions and revenue/profitability.

Although the ESG reports of TCC Group and ACC Group are prepared to comply with Taiwanese regulations, these reports cover the various subsidiaries of both companies. Furthermore, both companies follow the Global Reporting Initiative (GRI) guidelines, which are widely used internationally for disclosure purposes. In terms of ESG performance, the six selected ESG indicators in this study, namely Sustainalytics ESG Risk Score, MSCI ESG Rating, FTSE Russell ESG Rating, ISS ESG Rating, S&P Global ESG Score, and Moody's ESG Score, evaluate the overall operations of the companies. In other words, while both TCC Group and ACC Group have revenue concentration in mainland China, they still exhibit different ESG performance at the parent company level. Therefore, the findings of this study support Hypothesis 1, which suggests that companies with similar business bases and levels of business performance may demonstrate divergent ESG actions.

Furthermore, regarding CSV, since this study primarily relies on the ESG reports of both companies as the main data source, which includes the subsidiaries of TCC Group and ACC

Group, the assessment pertains to the overall ESG and CSV actions of the two companies, rather than solely focusing on their ESG actions in Taiwan.

This study posits that the similar profitability between TCC Group and ACC Group could indeed stem from their businesses' concentration in mainland China, where their profitability is primarily influenced by market fluctuations rather than ESG and CSV actions. Hence, the disparity in CSV levels but the lack of significant differences in profitability between the two companies is observed.

5.3. Why does a strong CSV performance lead to a strong ESG performance?

The next area worth exploring is the relationship between strong CSV performance and strong ESG performance. This study has already confirmed that, under other conditions remaining unchanged, strong CSV performance leads to even stronger ESG performance. But where does this connection come from? This study believes that this must be explored by returning to the definition of CSV. Two important criteria for CSV are "Societal Problem's Alignment with the Value Chain" and the creation of "direct economic profit". If an ESG behavior can simultaneously solve a social problem and bring profitability to the company, it naturally strengthens the company's willingness to continue this behavior.

If an ESG behavior can only solve social problems but cannot bring profitability to the company, or vice versa, if a behavior can bring profitability to the company but cannot solve social problems, this is not an action recognized by CSV. The former is just pure charity, although it brings reputation to the company, but when the market is unfavorable or the company faces economic turmoil, such expenditures are likely to be cut first; the latter is the normal behavior of the company, and the fundamental purpose of the company's existence is to make a profit, but this is certainly not what the modern society that emphasizes ESG likes to see. Not to mention harming society to bring profits to the company. This is also the main

reason why this study believes that ACC Group performed poorly in the material topic of indigenous rights and local communities.

Relatively speaking, when an ESG behavior can bring direct economic benefits to the company, this will make the company more willing to engage in such behavior, thereby solving more social problems and bringing more profits to the company. Even when the industry is in a bad situation, companies will not easily discard relevant behaviors. Taking TCC Group and ACC Group as examples, the cement industry is an industry highly affected by economic cycles. When the market is booming, the use of cement naturally increases, and vice versa. However, regardless of the market situation, TCC Group and ACC Group continue to work tirelessly on energy and circular economy material topics, and have not reduced their efforts in improving these areas due to declining profits. In addition, TCC Group's entry into the energy and energy storage industry is also based on similar reasons. TCC Group mainly uses renewable energy in the energy industry, but renewable energy is not as stable as nuclear power or thermal power generation. For example, solar energy may not be used at night, and wind power is restricted by the season, which requires the energy storage industry to assist. When the energy and energy storage industry can bring stable profits to TCC Group, TCC Group will naturally not easily give up this industry, which can form a positive cycle of solving social problems while bringing profits to the company.

In summary, this study believes that strong CSV performance can bring positive reinforcement to companies, that is, obtaining benefits from CSV behaviors, and this benefit will make companies continue to engage in CSV behaviors.

5.4. Research Limitations

5.4.1. CSV is not the only mechanism affecting ESG performance

Although this study has demonstrated that CSV is one of the mechanisms affecting ESG performance, there are many other factors or mechanisms that can influence ESG

performance, which cannot be fully controlled in this study. By controlling for industry, revenue, profitability, and market, this study has found that two companies with similar business bases and levels of business performance can have different ESG performance, and inferred that this difference comes from different levels of CSV. However, there may still be many other factors that can cause differences in ESG performance between TCC Group and ACC Group.

For example, it is possible that TCC Group is more proactive in meeting the requirements of various ESG rating agencies than ACC Group. This study used six of the most commonly cited international ESG rating agencies as a measure of ESG performance, which attempted to reduce bias. However, it is still possible that TCC Group is more proactive in meeting the requirements of these agencies, which can make their ESG performance seem better. This aspect may be evaluated by other methods, such as other quantitative data, or even qualitative interviews. However, ACC Group also proudly presents its ESG rating scores and awards in its ESG reports, indicating that they also value ESG rating agencies highly. Thus, this study infers that it is highly likely that ACC Group is indeed performing worse than TCC Group in terms of ESG performance, leading to lower ESG rating scores. This issue may require future improvements in research methods or a refinement of ESG rating methodologies to address it.

5.4.2. Limitations of Data Collection

The scope of this study includes the ESG reports of TCC Group from 2014 to 2021, the ESG reports of ACC Group from 2013 to 2021, and the annual reports of both companies in the corresponding years, as well as all available news reports and interviews as supporting evidence. However, the data collection range may have limitations.

For example, the annual reports for both companies in 2022 have not yet been released, so it is impossible to determine the latest developments of CSV for both companies. This can

only be inferred from the revenue and profit in 2022, and this part requires further improvement in future research.

In addition, both ESG reports and annual reports are data released by the companies, although they have been confirmed by accountants and can be trusted for their accuracy, there may still be intentional beautification of data or presenting only the positive aspects. For example, this study has proven that ACC Group's ESG performance is not as good as TCC Group's, but in ACC Group's ESG report, they still try to promote their ESG actions and only select their own advantages for promotion. They mention that "ACC Group has been selected as a component stock of the Taiwan Sustainable Index for four consecutive years due to its active promotion of ESG; in 2021, ACC Group received the highest AAA rating in the SEED evaluation launched by Cathay Financial Holding and Taipei University, ranking among the top 2% in 200 manufacturing companies". From these statements, researchers may easily mistake ACC Group as the only leader in the ESG of Taiwan's cement industry. This study attempts to reduce this bias by selecting six ESG indicators and comparing both companies with the same benchmarks, but the possibility of being misled by the promotional language in the ESG report cannot be ruled out.

Since all research data in this study are secondary data, this study did not conduct qualitative interviews with the company's leadership or relevant personnel, nor did it visit the business bases of TCC Group and ACC Group in person. The accuracy and credibility of the data can only be confirmed through multiple comparisons of secondary data. If the results of this study can be used to interview the company's leadership, it may be possible to explore the motivation of companies to engage in CSV and ESG actions, which can make the research results more comprehensive. This may be a direction for future research.

5.4.3. Limitations of Research Scope and Methods

This study compared TCC Group and ACC Group, but since these two companies are both involved in the production and sale of cement in Taiwan and mainland China, there are

doubts as to whether the conclusions of this study can be extrapolated to other regions or industries. For example, while this study argues that a high degree of CSV leads to better ESG performance, this may be due to the characteristics of the cement industry itself, or to certain other traits specific to Taiwan or mainland China. In other words, this study cannot determine whether this conclusion is solely due to CSV or if there are other factors or mechanisms at play in this causal relationship. This requires future researchers to conduct similar studies on companies in other industries or regions.

5.5. Future Research Directions

5.5.1. Expand the Sample and Research Scope

As described in the section on research limitations, this study only compared TCC Group and ACC Group. Although these two companies have been verified for their similarity, which allows for the exploration of the relationship between CSV and ESG while controlling for specific conditions, future researchers can try similar methods to compare other companies.

In addition, this study only conducted a secondary data comparison from 2013 to 2021. If it is possible to extend the time span or collect more primary data, it can create a more profound foundation for related research.

This study chose the highly polluting cement industry as the research target and verified the relationship between CSV and ESG. However, it is still unknown whether other industries can have similar conclusions. Future researchers can also consider applying similar methods to other industries, which can create a more abundant academic environment for CSV-related theories.

5.5.2 Define CSV in Other Ways

Currently, this study adopted three criteria from Menghwar and Daood (2021) to define CSV. However, since academic discussions on CSV are still in a dynamic process and there is

no consistent view on CSV, future researchers can consider the following directions for CSV-related research.

Since Menghwar and Daood (2021) did not provide explicit operational definitions for their three criteria, this study defined these criteria based on their paper. However, there may still be room for further discussion in this area. For example, this study defined the "regular assessment and updates" portion of the "Strategic Process" criterion as a material topic that has been addressed by the company for more than five consecutive years. Future researchers could choose different time spans to investigate the "Strategic Process" under different conditions. Alternatively, they could consider defining "what is Strategic Process" in different ways, which would expand research related to CSV.

5.5.3 Investigating other factors or mechanisms that influence ESG

This study verified the positive relationship between the level of CSV and ESG performance, but it is still uncertain what other factors or mechanisms affect ESG. Current literature mostly discusses ESG as an independent variable, with fewer discussions as a dependent variable. However, as climate change continues to worsen, ESG is increasingly being recognized by academia and the business community, and what factors or mechanisms contribute to good ESG performance will become a focus of attention. Therefore, this study hopes that future researchers will be inspired by this study to investigate whether there are still other factors or mechanisms that influence ESG and encourage companies to adopt ESG practices.

Chapter VI. Conclusion

Since the introduction of the concept of CSV by Porter and Kramer (2006, 2011), it has been a significant topic of discussion in the field of ESG. While Menghwar and Daoood (2021) conducted a systematic literature review of CSV and proposed a definition, empirical research on this definition is still lacking. This study compared TCC Group and ACC Group, two cement companies, using ESG reports and annual reports from 2013 to 2021, and analyzed the data using the CSV definition and criteria proposed by Menghwar and Daoood (2021). The results of this study show a positive relationship between CSV and ESG performance in the cement industry. Moreover, aligning social problems with the value chain and creating direct economic profit are two important standards for CSV, which are essential for companies to maintain their commitment to ESG actions. This study's results provide insights for policymakers, investors, and managers to encourage companies to adopt the CSV concept to promote positive cycles of ESG practice and create value for both society and business.

However, this study also has limitations, such as the use of secondary data from ESG reports and annual reports, which may not be as reliable as primary data, and the limited sample size. Future research can expand the sample size and time frame and compare the relationships between CSV and ESG performance in other companies or industries. Additionally, future studies can consider using different CSV definitions and standards to define CSV and investigate their reliability and validity. Furthermore, there are many other factors or mechanisms that affect ESG, not just CSV. Future researchers can explore other factors or mechanisms that affect ESG performance, especially considering the current situation where ESG is often studied as an independent variable rather than a dependent variable.

Chapter VII. Reference

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