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Exploring the Impact of Digital Leadership and Green Digital Innovation on Corporate Digital Transformation

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Abstract

This study investigates the interplay between digital leadership and green digital innovation and their combined influence on corporate digital transformation. By conducting a comprehensive literature review, we formulate several hypotheses aimed at identifying the key variables that drive this relationship. Employing qualitative methods, including interviews with industry leaders and case studies of organizations that successfully integrate digital leadership with sustainable practices, we analyze how these elements can be leveraged to facilitate transformative processes. Consequently, our findings reveal that organizations characterized by strong digital leadership are more adept at implementing green innovations, resulting in enhanced operational efficiency and competitive advantage. Additionally, we highlight the critical role of effective leadership in cultivating an innovative culture that embraces sustainability. The results emphasize the importance of integrating green practices into digital strategies, suggesting that this synergy not only meets corporate social responsibility goals but also drives meaningful digital transformation.

Keywords : Digital Leadership, Green Digital Innovation, Corporate Digital Transformation, Qualitative Analysis, Sustainability

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Introduction

In the era of rapid technological advancement, digital transformation has emerged as a critical imperative for organizations seeking to enhance their operational efficiency, customer engagement, and competitive advantage. Simultaneously, the growing emphasis on sustainability has led businesses to adopt green practices as integral components of their strategies. This paper investigates the dual role of digital leadership and green digital innovation in driving corporate digital transformation (Liu & Cui, 2024). Moreover, Digital leadership encompasses the capabilities of leaders to effectively manage digital initiatives and inspire teams towards embracing change. Green digital innovation refers to the adoption of technologies that not only enhance business processes but also contribute positively to environmental sustainability. This study posits that organizations that effectively blend these two dimensions are more likely to achieve successful digital transformation.

In the context of escalating environmental challenges and the rapid evolution of digital technologies, organizations face an urgent need to adapt through effective digital transformation strategies. This study is driven by two primary research questions:

RQ1. How does digital leadership influence the adoption of green digital innovations within organizations?

RQ2. Furthermore, what is the impact of these innovations on corporate digital transformation outcomes?

The motivation for exploring these questions stems from the growing recognition that sustainable practices are no longer ancillary to business strategies but essential for long-term viability. As companies increasingly prioritize environmental sustainability, understanding the synergies between digital leadership and green innovation becomes crucial for fostering effective transformation processes. This exploration seeks to bridge the gap in existing literature regarding the integrated roles of leadership and innovation in achieving successful digital transformation while addressing sustainability goals.

To answer the research questions, this study employs a qualitative research design that includes semi-structured interviews and case studies. The interviews will involve key decision-makers and executives from diverse industries, allowing us to gather rich insights into their experiences and perspectives on the interplay between digital leadership and green digital innovation (Liu & Cui, 2024). Additionally, we will analyze case studies of organizations that exemplify effective integration of these elements. This dual approach will enable us to triangulate data, ensuring a comprehensive understanding of how digital leadership can foster a culture of innovation that prioritizes sustainability. By examining the specific practices and strategies employed by these organizations, we aim to identify key variables that contribute to successful digital transformation, thus providing valuable insights for both practitioners and scholars.

The paper is structured to facilitate a coherent flow of ideas and insights. Following this introduction, a thorough literature review will be presented, outlining existing theories and empirical findings related to digital leadership, green innovation, and

digital transformation. We will then articulate our hypotheses based on this review, followed by a detailed methodology section that outlines our research design. The results section will present the findings from our interviews and case studies, highlighting the key themes that emerged from the qualitative analysis. In the discussion section, we will interpret these results in the context of our research questions, emphasizing the implications for theory and practice. Finally, we will conclude the paper by summarizing our findings and offering recommendations for future research. This study contributes to the academic discourse by elucidating the critical role of integrating digital leadership and green innovation in driving corporate digital transformation, thereby providing a roadmap for organizations aiming to navigate the complexities of sustainable digital evolution.

Literature Review

Digital Leadership

Digital leadership is defined as the ability of leaders to navigate the complexities of digital technologies and their implications for organizations. Northouse (2018) emphasizes that effective leadership in a digital context requires not only technical skills but also the ability to foster a culture of innovation and adaptability. Leaders who prioritize digital initiatives can motivate their teams to embrace technological changes, thus enhancing the likelihood of successful digital transformation (Brown & Green, 2023).

Green Digital Innovation

Green digital innovation is the intersection of sustainability and technology, focusing on the development and implementation of digital solutions that reduce environmental impact (Klewitz & Hansen, 2014). It includes practices such as utilizing renewable energy sources, optimizing resource usage through smart technologies, and adopting circular economy principles. The integration of green innovation into business processes not only fulfills corporate social responsibilities but also enhances brand reputation and customer loyalty (Kollmann & Stöckmann, 2019).

The Interplay of Digital Leadership and Green Innovation

Research indicates that digital leadership plays a pivotal role in fostering an organizational culture conducive to innovation (Haffke, Kalgovas, & Benlian, 2016). Leaders who advocate for sustainable practices can drive the adoption of green digital innovations, thereby aligning corporate strategies with environmental objectives. This synergy can lead to enhanced digital transformation, enabling organizations to respond effectively to market demands while minimizing their ecological footprints (Zhang et al., 2019).

Hypothesis 1 - Digital Leadership and Green Digital Innovation

The first hypothesis posits that digital leadership has a positive influence on the adoption of green digital innovation within organizations. Digital leadership encompasses the ability of leaders to navigate the complexities of digital technologies while inspiring their teams to embrace change. Leaders who demonstrate a commitment to sustainability are more likely to foster an organizational culture that encourages innovative practices. This cultural shift is critical for the successful implementation of green initiatives, as it requires buy-in from all levels of the organization. By promoting an environment that prioritizes sustainability, digital leaders can motivate employees to explore and adopt technologies that reduce environmental impact, such as energy-efficient solutions and data-driven sustainability practices. Research supports this assertion, indicating that organizations led by visionary leaders who champion digital transformation tend to adopt sustainable innovations more readily. As such, this hypothesis emphasizes the vital role of leadership in driving green initiatives, suggesting that effective digital leaders are instrumental in aligning technological advancements with environmental goals. Consequently, fostering digital leadership can be a strategic priority for organizations aiming to integrate sustainability into their operational frameworks.

Hypothesis 2 - Green Digital Innovation and Corporate Digital Transformation

The second hypothesis suggests that green digital innovation has a positive impact on corporate digital transformation. In an increasingly competitive marketplace, organizations are recognizing that integrating sustainability into their core business practices is essential for long-term success. Green digital innovation involves the development and implementation of technologies that not only enhance efficiency but also mitigate environmental harm. Such innovations can lead to significant improvements in operational performance, including cost savings through resource optimization and enhanced brand reputation among environmentally conscious consumers. Moreover, as businesses adopt green technologies, they often experience transformative changes in their processes and strategies, allowing them to adapt more rapidly to market demands. This transformative capability is a crucial component of digital transformation, which encompasses the integration of digital technology into all areas of business. By leveraging green innovations, organizations can enhance their digital transformation efforts, positioning themselves as leaders in sustainability while simultaneously improving their competitive edge. Therefore, this hypothesis highlights the interconnectedness of sustainability and digital advancement, asserting that the pursuit of green digital innovations can serve as a catalyst for broader corporate transformation initiatives.

Hypothesis 3 - Mediation of Green Digital Innovation

The third hypothesis explores the mediation role of green digital innovation in the relationship between digital leadership and corporate digital transformation. This proposition builds on the premise that while digital leadership directly influences the adoption of innovative practices, the true impact on corporate digital transformation is realized through the implementation of green digital innovations. Effective digital leaders not only inspire their teams to adopt new technologies but also advocate for sustainable practices that align with the organization's strategic vision. As these leaders promote a culture of sustainability, they pave the way for the successful introduction of green innovations, which, in turn, facilitate significant changes in business operations and strategies (Zheng et al., 2024). The mediation effect suggests that digital leadership alone may not suffice to drive transformation; rather, it is the integration of green digital innovations that amplifies the impact of leadership efforts. Empirical evidence indicates that organizations with strong digital leadership and a focus on sustainability are better equipped to navigate the complexities of digital transformation. This hypothesis underscores the importance of considering both leadership dynamics and innovation strategies in understanding how organizations can effectively achieve transformative goals while addressing environmental challenges. By establishing this mediation relationship, we provide a framework for examining the multifaceted influences that shape corporate digital transformation in today's sustainability-conscious business landscape.

Theory Supporting Hypothesis 1

The theoretical framework supporting Hypothesis 1, which posits that digital leadership positively influences the adoption of green digital innovation, can be grounded in transformational leadership theory. Transformational leadership emphasizes the ability of leaders to inspire and motivate their followers to achieve exceptional outcomes by fostering an environment of trust, innovation, and commitment to a shared vision. Leaders who embrace digital transformation are more likely to engage in behaviors that promote sustainability and green innovation (Zheng et al., 2024). They do this by encouraging open communication, facilitating collaborative efforts, and empowering employees to take initiative in pursuing innovative solutions that benefit both the organization and the environment. Studies have shown that transformational leaders play a crucial role in shaping organizational culture, making it more conducive to adopting sustainable practices. This theory suggests that when leaders prioritize sustainability and actively promote green initiatives, they can effectively mobilize their teams towards implementing innovative technologies that reduce environmental impact. By leveraging the principles of transformational leadership, organizations can enhance their capacity for adopting green digital innovations, which ultimately contributes to achieving their broader sustainability goals.

Theory Supporting Hypothesis 2

Hypothesis 2, which asserts that green digital innovation positively impacts corporate digital transformation, is supported by the resource-based view (RBV) theory. The RBV posits that an organization's resources and capabilities are critical to achieving competitive advantage and superior performance. Green digital innovations represent valuable resources that can enhance operational efficiency, reduce costs, and improve brand reputation in a sustainability-conscious marketplace. By integrating sustainable technologies and practices, organizations can optimize their resource usage, leading to enhanced productivity and innovation. Moreover, the adoption of green innovations allows firms to differentiate themselves from competitors, appealing to environmentally aware consumers and stakeholders. The RBV emphasizes that the strategic deployment of these green innovations can lead to a reconfiguration of business processes, facilitating a more agile and responsive organizational structure. Consequently, this integration contributes to corporate digital transformation by enabling organizations to adapt to market changes more effectively (Zheng et al., 2024). By aligning their operational strategies with sustainability objectives, companies can leverage green digital innovations to not only meet regulatory requirements but also gain a competitive edge, thereby reinforcing the importance of sustainability in the digital transformation journey.

Theory Supporting Hypothesis 3

The theoretical foundation for Hypothesis 3, which explores the mediation role of green digital innovation between digital leadership and corporate digital transformation, can be anchored in the knowledge-based view (KBV) of the firm. The KBV emphasizes the significance of knowledge as a vital resource in driving organizational capabilities and innovation. In this context, digital leadership plays a pivotal role in fostering a knowledge-sharing culture that encourages the exploration and adoption of green innovations. Leaders who are knowledgeable about digital technologies and sustainability are better equipped to guide their organizations in integrating these innovations into their operations. This knowledge transfer facilitates the effective implementation of green digital innovations, which serves as a bridge linking leadership practices to transformation outcomes. Furthermore, the KBV suggests that organizations that harness and leverage their intellectual capital are more likely to achieve successful transformations (Zheng et al., 2024). By promoting a culture of learning and innovation, digital leaders can enhance the firm's capabilities in developing and implementing green solutions. Thus, the mediation effect proposed in this hypothesis highlights the interconnectedness of leadership, knowledge, and innovation, underscoring the necessity of integrating these elements to navigate the complexities of corporate digital transformation while achieving sustainability goals (Zheng et al., 2024).

Methodology

Qualitative Research Design

This study adopts a qualitative research design aimed at gaining deep insights into the dynamics of digital leadership and green innovation as they relate to corporate digital transformation. To accomplish this, we utilize two primary data collection methods: interviews and case studies. By employing these approaches, we can capture the nuanced experiences and perspectives of industry leaders who are navigating the challenges of digital transformation. The qualitative nature of this research allows for rich, context-specific insights that quantitative methods might overlook. This design is particularly beneficial for exploring the complex interplay between leadership and innovation, offering a more holistic view of how organizations can successfully integrate sustainable practices within their digital strategies.

Data Collection Methods

To gather pertinent data, we will conduct semi-structured interviews with executives and managers across various sectors. This format is chosen to facilitate an open dialogue while ensuring that key topics related to digital leadership and green innovation are addressed. The interviews will provide a platform for participants to share their experiences, challenges, and strategies in implementing sustainable innovations within their organizations. Additionally, we will analyze selected case studies of organizations that have effectively integrated digital leadership and green innovation into their operational frameworks. These case studies will serve as practical examples of best practices, showcasing how these organizations have successfully aligned their sustainability initiatives with their digital transformation efforts, thereby enriching our understanding of the topic.

Data Analysis Approach

For data analysis, we will employ thematic analysis, a qualitative method that focuses on identifying, analyzing, and reporting patterns or themes within qualitative data. This approach allows us to systematically interpret the insights gathered from interviews and case studies, highlighting the key themes related to digital leadership and green innovation. By examining the transcripts of interviews and the findings from case studies, we will be able to draw meaningful connections between leadership practices and innovative sustainability initiatives. Thematic analysis enables us to explore the depth and breadth of participants' experiences, providing a comprehensive understanding of how digital leadership fosters a culture of green innovation that contributes to successful digital transformation. Ultimately, this analytical framework will guide our exploration of the intricate relationships among the variables of interest in our study.

Results and Discussion

The findings from our qualitative study reveal significant insights into the relationship between digital leadership, green innovation, and corporate digital transformation. By analyzing data from semi-structured interviews and case studies, we identified several key themes that illustrate how effective digital leadership facilitates the adoption of green innovations and drives successful digital transformation.

Theme 1: Visionary Leadership and Commitment to Sustainability

One prominent theme that emerged from the interviews was the critical role of visionary leadership in fostering a commitment to sustainability within organizations. Leaders who prioritize green initiatives demonstrate a strong alignment between their digital transformation strategies and sustainability goals. For instance, several executives emphasized that their organizations' commitment to environmental responsibility was not merely an add-on but a core element of their digital strategies. This alignment is often reflected in the leaders' proactive approach to integrating sustainable practices into their business models. Interview participants shared examples of how their organizations have set ambitious sustainability targets, such as reducing carbon emissions or increasing energy efficiency, which in turn catalyzed the adoption of green digital innovations. Such visionary leadership is instrumental in creating an organizational culture that values innovation and sustainability, ultimately enhancing the effectiveness of digital transformation efforts (Zheng et al., 2024).

Theme 2: Collaborative Culture and Knowledge Sharing

Another key finding was the importance of fostering a collaborative culture that encourages knowledge sharing and innovation. Effective digital leaders actively cultivate environments where employees feel empowered to contribute ideas related to green innovations. Many interviewees highlighted the significance of cross-functional teams in driving sustainability initiatives, as collaboration across departments enables organizations to leverage diverse expertise and perspectives. Leaders facilitate this collaboration by implementing structured processes for knowledge sharing, such as workshops and innovation hubs, which encourage employees to share their insights and experiences related to sustainable practices. This culture of collaboration not only enhances the organization's capacity for innovation but also helps in overcoming resistance to change, as employees become more engaged in the digital transformation process. The ability to share knowledge and best practices is essential for successfully integrating green innovations, as it leads to more informed decision-making and effective implementation strategies (Benitez et al., 2022).

Theme 3: Alignment of Technology and Sustainability Initiatives

The alignment of technology and sustainability initiatives emerged as a crucial factor in successful digital transformation. Interviewees noted that organizations that effectively integrate green digital innovations into their operational frameworks tend

to experience enhanced efficiency and competitive advantage. For instance, one case study revealed how a manufacturing firm implemented smart technology to monitor energy consumption and reduce waste, resulting in significant cost savings and a reduced environmental footprint. This case illustrates the tangible benefits that arise when organizations strategically align their technological investments with sustainability objectives. Moreover, leaders who actively champion green technology initiatives can influence the organization's strategic direction, ensuring that sustainability remains a priority in digital transformation efforts (Benitez et al., 2022). This alignment not only drives operational improvements but also enhances the organization's reputation among stakeholders, reinforcing the business case for sustainability.

Theme 4: Measuring Success and Impact

Finally, the theme of measuring success and impact emerged as vital to understanding the effectiveness of digital leadership and green innovation in driving digital transformation. Many leaders emphasized the importance of establishing clear metrics and KPIs to evaluate the outcomes of their sustainability initiatives. This data-driven approach enables organizations to track progress, assess the impact of green innovations, and make informed adjustments to their strategies. Interview participants shared experiences of using performance metrics to communicate achievements related to sustainability to both internal and external stakeholders, thereby enhancing transparency and accountability (Benitez et al., 2022). By effectively measuring success, organizations can not only demonstrate their commitment to sustainability but also reinforce the business value of their digital transformation initiatives.

Conclusion

The findings of this study reveal the intricate relationship between digital leadership, green innovation, and corporate digital transformation. Through qualitative analysis of interviews and case studies, several key themes emerged. First, visionary leadership is critical in promoting a commitment to sustainability. Leaders who integrate green objectives into their digital transformation strategies foster an organizational culture that values both innovation and environmental responsibility. Second, collaboration and knowledge sharing were highlighted as essential components of successful green innovation. By encouraging cross-functional teamwork, organizations can leverage diverse perspectives to enhance their sustainability initiatives. Third, aligning technology with sustainability goals was found to drive operational efficiency and competitive advantage (Xia et al., 2023). Case studies illustrated how companies that strategically integrated green technologies not only improved their environmental performance but also achieved significant cost savings. Finally, the importance of measuring success through clear metrics was emphasized, enabling organizations to track progress and communicate achievements effectively. These findings underscore the multifaceted role that digital leadership plays in advancing sustainable practices within the context of digital transformation.

Implications

The implications of these findings are significant for organizations seeking to navigate the complexities of digital transformation while prioritizing sustainability. First, organizations should recognize the importance of visionary leadership in fostering a culture that embraces both digital and green initiatives. This involves not only setting ambitious sustainability goals but also actively engaging employees in the innovation process. Second, creating a collaborative environment that encourages knowledge sharing can enhance the effectiveness of green innovations, leading to more successful digital transformation efforts. Organizations should implement structures that facilitate cross-departmental collaboration and idea exchange (Xia et al., 2023). Additionally, aligning technology investments with sustainability objectives is essential for achieving operational improvements and enhancing brand reputation. Finally, establishing clear performance metrics will enable organizations to measure the impact of their sustainability initiatives, reinforcing their commitment to both environmental stewardship and business success. These implications provide a roadmap for leaders aiming to integrate green practices into their digital strategies effectively.

Contribution

This study contributes to the existing literature by bridging the gap between digital leadership, green innovation, and corporate digital transformation. While previous research has examined these concepts in isolation, this study highlights their interconnections and the critical role of leadership in facilitating sustainable practices within organizations. By employing a qualitative approach, the research provides rich, contextual insights that quantitative studies often overlook. The identification of key themes—such as visionary leadership, collaboration, technology alignment, and performance measurement—offers practical guidance for organizations seeking to enhance their sustainability efforts. Furthermore, this research emphasizes the importance of adopting a holistic approach to digital transformation that incorporates sustainability as a core objective. By doing so, it lays the groundwork for future studies to explore the evolving dynamics between leadership, innovation, and sustainability in a rapidly changing business landscape (Benitez et al., 2022).

Limitations

Despite its valuable insights, our study is not without limitations. The qualitative nature of the research means that findings may not be generalizable across all industries or organizations. The sample size, while rich in detail, may not fully capture the diversity of experiences and perspectives present in the broader population. Additionally, the focus on interviews and case

studies may introduce biases, as participants may emphasize positive outcomes while downplaying challenges faced in implementing green innovations. Furthermore, the rapidly evolving nature of digital technologies and sustainability practices may limit the long-term applicability of the findings (Fatima & Masood, 2024). Future research could address these limitations by employing a more extensive and diverse sample, incorporating quantitative methods to validate the findings, and exploring the impact of external factors such as regulatory changes and market dynamics on the relationship between digital leadership and green innovation.

Future Work Directions

Future research should build on the findings of this study by exploring several avenues. First, longitudinal studies could provide insights into the long-term effects of digital leadership on the adoption of green innovations and corporate digital transformation. This approach would help capture changes in organizational culture and practices over time, offering a more comprehensive understanding of the dynamics at play (Xia et al., 2023). Additionally, research could investigate how different sectors approach the integration of digital leadership and sustainability, identifying best practices and potential challenges unique to specific industries. Furthermore, examining the role of external stakeholders, such as customers and regulatory bodies, in influencing organizations' sustainability initiatives would provide valuable context (Fatima & Masood, 2024). Finally, exploring the interplay between technological advancements, such as artificial intelligence and data analytics, and green innovations could shed light on new opportunities for organizations to enhance their sustainability efforts. By pursuing these directions, future work can further enrich the dialogue around digital leadership and green innovation in the context of corporate transformation.

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Challenges in financial management from the perspective of mining companies

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Abstract

Chinese enterprises are constantly reforming and developing under the economic system, and are facing huge challenges. After three years of the outbreak of the new crown epidemic, China's economy is now ushering in a period of moderate recovery. Under the changes in the international economic situation, China's manufacturing industry has been suppressed, the development growth rate is slow, and mineral enterprises, as upstream industries, have also been affected to a corresponding extent in the entire closed loop of economic development. From the perspective of enterprise economy, it is very important to optimize the financial management system within the enterprise. Based on the financial management risks faced by the changes in the economic system, this paper analyzes the problems in the process of financial management and puts forward targeted suggestions.

Keywords : Financial management; mining enterprises; financial risk; Industrial layout

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Introduction

The management system of the enterprise requires managers to learn to use advanced management technology in the process of practice, improve the management level of the enterprise, improve the operating conditions of the enterprise, and empower the enterprise in order to adapt to the development of the times. A high-level financial management system enables companies to get the maximum return with the minimum investment amount, especially for companies with large upfront investment amounts. As an upstream industry, mining enterprises have been greatly impacted, and product prices have plummeted. Affected by the epidemic and product prices, some mines were suspended. The production and operation of mining enterprises have suffered a huge crisis, and problems such as the inability of workers to work, the difficulty of maintaining production and marketing, and the difficulty of connecting the capital chain with business activities have become prominent. The operation and management and development of enterprises are constantly adjusted and modified with the help of social economy, so a scientific and effective financial management system is an important cornerstone for the sustainable development strategic goals of enterprises.

The domestic situation faced by the financial management of mining enterprises

Changes in mining industry policy

Under the background of the new normal, China is facing many challenges such as speed shift and industrial chain structure adjustment, but high-quality development is inevitably inseparable from the control of modern financial management methods. General Secretary Xi Jinping has put forward clear requirements for the resource-based economy. In the face of the new situation, especially the turbulence of the economic market under the epidemic conditions, the optimization of industrial management is becoming more and more important.

Transaction management adopts competitive transfer, centralized transaction, transfer contract management, etc., and optimizes the division of responsibilities between the natural resources management department and the trading platform. The conditions for suspension and termination of trading behavior have been refined; Strengthened the time-bound requirements for the transaction process; Liability for breach of contract and credit supervision have been improved[1]. From the perspective of corporate financial management, changes in transaction rules affect the relevant variables of the valuation model.

Mining trends

Mining production is a high-risk industry, and casualties and property losses caused by mining safety accidents have emerged in media reports one after another, which has attracted great attention from the society. For a long time, the work of mining safety management in China has relied heavily on administrative management and has not paid attention to the construction of the legal system. From the perspective of mining financial management, the popularization and strengthening of legal awareness is the key factor to promote the implementation of the mining safety production management system, which reduces the cost of appeal and compensation to a certain extent, and indirectly enhances the wealth value of enterprises.

Adhere to sustainable green development and promote the construction of ecological civilization in a resource-saving manner. Through the optimization of global resource allocation, a safe and stable supply system will be established to meet the sustainable development ideas of mining enterprise resources.

The internal financial management environment of the enterprise

The financial management of mineral enterprises that is carried out in an all-round way around the production and operation activities of enterprises is inseparable from the advanced financial management system that matches the market economic environment. In a standardized financial management environment, the company's leadership and non-finance-related functional departments can have a certain degree of understanding of a series of financial management concepts such as the time value of money, opportunity cost, sunk cost, etc. In the fast-changing market, in order to seize the opportunity, the internal financial management of enterprises needs to improve financial awareness in the standard.

A change in the concept of financial management

The work content performed by the financial department of the enterprise is usually the collation and accounting of data, and the managers of most enterprises have a limited understanding of the accounting work, and only think that the accounting of data is carried out, and there is a lack of a process of analyzing data and communicating with other departments, and what is the important role of financial work in the operation and management of the enterprise that is completely ignored? Its financial management concept lags behind, does not have the awareness of management accounting, and cannot give full play to the advantages of management accounting for the sustainable development of enterprises. In addition, although the government has issued opinions and guidance on the transformation of management accounting, some enterprises lack management awareness and do not strictly implement the regulations in the specific implementation, resulting in poor results in the transformation work. Therefore, it is difficult to change the concept of financial management to keep pace with the times.

Analysis of the problems existing in the financial management of mining enterprises

There is a lack of initiative in financial management

In daily work, the financial management of mining enterprises is gradually becoming standardized, and there is a set of its own model. Most of the financial staff in the company only focus on the historical work such as financial management records, financial statements, and financial data, and the analysis level is only limited to historical data, rather than looking at financial management from a development perspective, without taking into account the future development trend. Financial management and financial accounting are essentially the management of the assets of the enterprise, but financial management is different from accounting that only focuses on historical data, and financial management is more about the analysis of the unknown market in the future, considering market risks, the time value of money, etc. to provide information to the management. The lack of active application is a major weakness in financial management, and at the same time, there is no corresponding management early warning mechanism.

Lack of interdisciplinary financial management talents

In China, most traditional enterprises tend to ignore the cultivation and management of high-level talents, the aging of employees is serious, the age structure of internal employees is unreasonable, and there is a lack of fresh blood injection. With the reform and development of the economic system, enterprises have realized the importance of talent management, especially the professional management of financial managers, which not only requires financial personnel to have professional quality, but also requires them to understand and master other knowledge related to non-financial fields. A high-quality financial management work requires not only the support of financial data information, but also the relevant non-financial data information provided by other departments, which is considered comprehensively to make the information analysis more objective and accurate, so as to facilitate the correct decision-making of the management. Only when financial managers have a certain degree of understanding of the production and marketing process of the enterprise, can they accurately make accurate judgments and analyses on the information provided by relevant departments. However, China's geology and mineral enterprises are still a large number of scarce such compound financial management talents, which limits the further optimization of enterprise financial management to a certain extent.

The communication of internal financial data and information is not timely

The overall scale of mining enterprises is large, and it is common for too many financial systems to be duplicated. The financial system used by enterprises in the early days has accumulated a lot of historical information. Finance staff are familiar with the old system. With the development of software innovation, most enterprises at this stage are introducing ERP systems, using one system to cover all financial content [5]. However, in practice, the traditional financial system and ERP system cannot achieve data sharing, but increase the burden of information construction. In addition, the traditional financial work system does not play the role of financial data analysis, supervision and cross-tracking, resulting in enterprises still need to be carried out through departmental meetings when following up on projects and considering funds, which will also cause lag in information decision-making.

Enterprises do not have a strong sense of financial risk management

First of all, the financial risk control process design of mining enterprises is not sound, a complete and sound financial risk control process includes several aspects, according to the survey results, in terms of risk identification, most enterprises are through the issuance of questionnaires, fill in WeChat applets and forms and other forms to establish a risk identification framework, the results of the survey are limited by the sample, most of the people who fill in the form are to complete the task of the mentality to complete the survey, the results can only partially reflect the facts, reliability needs to be verified by a large number of samples. In terms of risk early warning, there is a lack of specific investigation when setting risk early warning targets, which makes the feasibility and completion too idealistic and deviates from reality. In addition, the design level of early warning indicators is too flat and single, resulting in the risk indicators not reaching the accuracy of prediction, and the timely and sensitive response plan cannot be made for the occurrence of emergencies, and the resulting deviation affects the effectiveness of the decision-making of enterprise operators to a certain extent. In terms of risk control, mining enterprises follow the inherent procedural characteristics of state-owned enterprises: approval, poor timeliness of approval. After discovering the risk early warning information, the enterprise needs to go through too many process links in the specific implementation of the risk prevention plan, resulting in a lot of time cost consumption, which makes the enterprise's response measures to the risk lack of effectiveness, misses the opportunity to respond, and causes a certain degree of loss.

The second is that the risk control target setting of the mining industry is unreasonable and unscientific. Risk management is a complex and lengthy process. It seems to be an ethereal slogan, but in fact it has a lot of potential. Goal setting must include strategic objectives, operational efficiency objectives, reporting timeliness objectives, and asset safety and integrity objectives. According to the survey, mining enterprises set risk control objectives in their daily operations and only focus on compliance objectives, often ignoring other objectives, and only focusing on the compliance disclosure of financial reports. The goal setting is too simple, and the lack of macro risk control objectives has caused enterprises to be in a passive situation when dealing with risks.

Management and its tendency to ignore the security risks of the company's internal financial system. The financial password of the basic position is open and the awareness of confidentiality among employees is very low, and there is a big problem with data security. In addition, the financial management personnel are not accustomed to the company's OA system, and never carry out key confidential file transmission and work communication on the system, and almost always use WeChat and other network platforms to communicate, resulting in a high risk of information leakage.

The internal control system is not perfect

The financial management and risk control system of an enterprise is a relationship that complements and influences each other. In the process of production and operation, a certain amount of funds is used as a guarantee for the normal consideration of working funds. Due to the fluctuating market environment, it will lead to unsatisfactory losses in actual use and expected efficiency, resulting in financial management crises; Or because of the imperfection of its own internal control system, the implementation performance is not up to standard, resulting in the company's profitability is not up to standard.

In the market environment, changes in any link factor will lead to the rupture of the company's internal economic circulation system, and effective internal control can minimize the cost of the enterprise. Internal control is mainly to supervise the business activities of various departments of the enterprise, the expenses incurred, and any aspects that are detrimental to the development of the enterprise. Therefore, enterprises must improve the relevant internal control system and emergency response measures in combination with their own business environment to ensure the controllability of financial and internal control risks.

Improvement measures to optimize the financial management of mining enterprises

Strengthen the quality education of financial management personnel

Emphasize the financial management of enterprises, standardize internal financial behavior, and create a good economic environment for enterprises. Through a variety of ways to increase the training of financial personnel, expand the knowledge of financial management personnel, but also fully mobilize their work initiative and initiative.

Improve internal information communication channels and establish an accounting information processing system

Mining enterprises need to adapt to the pace and development needs of the information age, strengthen the information construction of their own financial management, and also keep up with the pace of development, actively apply advanced information technology in the process of promoting information construction, and adopt new technologies to improve the internal information communication channels of enterprises. The network information construction of financial management effectively avoids the problems of serious information distortion, data fraud, and low efficiency of internal communication and communication in the traditional financial management model, and the data is managed in the background of the network, and is operated by specialized staff, which minimizes the possibility of financial information distortion and falsification, and ensures the reliability of information. Under the guidance of professional and technical personnel, the financial management system is deeply embedded with interconnected technology, which is not only conducive to the management to make final decisions, but also improves the efficiency and quality of the company's financial management. Only by solving the problem of integration between information data and network services and establishing a complete and scientific information processing system can the efficiency of financial management be maximized.

Strengthen the awareness of enterprise financial risk management

First of all, optimize the financial risk control process of the enterprise. Specifically, it is divided into the following steps: 1. The collection of financial risk information, including the collection of internal financial data of the enterprise, is carried out internally to understand the knowledge of relevant laws and regulations and new government policies; 2. Identify and evaluate the financial risk status, optimize the financial risk identification framework, and improve the risk identification rate; 3. Conduct in-depth analysis of the specific situation of financial risks, and carry out horizontal and vertical comparative analysis in a timely manner; 4. Improve financial risk control measures and adopt risk control strategies for the business conditions of the enterprise.

Secondly, formulate scientific risk management objectives, determine the macro- objectives of financial management in combination with the relevant theories and practical work of enterprise internal control, assume the social responsibility of the enterprise, and ensure the compliance operation of the enterprise. For the implementation of asset objectives, in addition to ensuring that the company's assets minimize asset risks, we also continuously strengthen our own asset management efforts. For business objectives, set long-term goals according to the different stages of their own development, and make corresponding changes and adjustments according to specific business conditions to ensure the long-term sustainable development of enterprises. For the disclosure target, the enterprise must ensure that the relevant business information, financial report information, audit report, etc. are disclosed and publicized to the public in a timely manner, and predict possible business risks. For strategic goals, the financial management goals of the enterprise and the strategic development must coincide.

Improve the internal restraint mechanism and improve the means of internal control

Through the establishment of a scientific and effective internal control system, to achieve the financial management goal of maximizing shareholder wealth, improve the comprehensive system of internal corporate financial management, and reduce operational risks.

The construction of the financial management system of mining enterprises is an indispensable and important part of the efficient operation of internal control and the promotion of sustainable development. Financial management is a complex and lengthy governance work, and under a scientific and effective management system, all departments of the company need to work together to strengthen the training and education of financial management personnel. In order to effectively implement the internal control system and various economic activities, a reasonable financial management system should be customized, so that each employee can clarify his or her responsibilities, ensure that each position can restrain each other, and avoid the loss of the company's interests due to personal ability; Strengthen communication between various departments, set up a special team to be responsible for risk management, strengthen the audit function, and implement strict information quality review and review; Finally, establish an incentive and restraint mechanism to motivate employees to continuously enhance their sense of self-morality and improve the reward and punishment system.

Improve financing channels

As a large-scale mining enterprise, the single financing channel will cause an unreasonable capital structure and increase financial risks. Broadening financing channels and determining a reasonable leverage ratio can reduce the financial pressure of enterprises and improve their existing business scale and debt repayment ability. Enterprises need to formulate a scientific and effective short-term loan plan with strict approval based on their own business conditions and development strategies. By improving financing efficiency, reducing financing costs and expenses, strengthening capital management, rationally arranging financing channels and establishing good capital institution relations, enterprises can obtain long-term and stable cash flow while meeting the company's sustainable development needs.

conclusion

With the changes in the manufacturing industry in the international market, as well as the gradual saturation of the market, if the mining enterprises cannot establish a scientific and complete financial management and control system in time, it is bound to endanger the survival and sustainable development strategy of the enterprise. It is necessary to strengthen the control of the internal environment and the functional training of the staff so that they can discover problems and solve them in a timely manner. Strengthen the awareness of financial risks and reduce the information barriers between employees in various departments. In addition, it is necessary to effectively establish a project evaluation mechanism to determine whether the scale of the industry and the feasibility of technical solutions and to predict the crisis factors that may be faced.

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Literature review on the impact of supply chain finance on the financing ability of building ceramics export enterprises

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Abstract

In recent years, affected by factors such as domestic macroeconomy, real estate market environment and environmental protection policies, the competition in the building ceramics product market has intensified, and the instability of the shipping situation and the international situation has amplified the unfavorable situation of China's building ceramics commodity exports. Therefore, whether it has a strong financing ability has become an important basis for measuring whether China's building ceramics enterprises can continue to operate. Based on the research of domestic and foreign scholars on the financing ability and supply chain finance of building ceramics export enterprises, this paper expounds the latest research path and provides a research direction for building ceramics export enterprises to enhance their own financing capabilities.

Keywords : Building Ceramic Export Enterprises; Supply Chain Finance; Financing Capacity

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Background and implications

Background

With the take-off of China's economy, China's export industry is also gradually growing in the wave. More and more building ceramics enterprises have gradually started to export business. The building ceramics industry as a whole presents a situation of "large market, small enterprises", low industry concentration, and structural overcapacity. And in recent years, affected by the domestic macroeconomy, real estate market environment and environmental protection policies, the export of building ceramic products "internal and external troubles": affected by national policies, power rationing and production have led to rising costs; The international situation is chaotic, the cost of shipping has risen sharply, and the unfavorable situation of exports has been magnified. The competition in the building ceramics industry has entered the era of shrinkage from the stock era, and the price competition of enterprises has intensified, and the financial pressure required for normal operation has increased. Because such enterprises are usually small in scale and cannot attract the attention of investment institutions, the financing channels are relatively narrow, it is difficult to solve the financing problem through commercial bank loans, and the financing ability of enterprises is poor.

What is architectural ceramics (abbreviated as building ceramics) and building ceramics export enterprises? According to the interpretation in the annual report of a number of building ceramics head enterprises, building ceramics refers to ceramic products used for building finishes or as building components, mainly referring to ceramic wall and floor tiles. This paper building ceramics export enterprises refer to the main building ceramics, and export products to other countries or regions of the enterprise, belongs to the production and export of industrial enterprises. The building ceramics industry is an asset-heavy and energy-intensive industry, which is more dependent on liquidity and cash flow.

Supply chain finance, as an emerging means to solve the financing of enterprises in recent years, provides a new idea for the financing ability of building ceramics export enterprises. The scale of building ceramics export enterprises is usually small, and they are in the position of non-core enterprises in the supply chain. With the help of supply chain financial instrument financing, the financial pressure of building ceramics export enterprises can be alleviated. This is because supply chain finance integrates the upstream and downstream enterprises of the supply chain centered on the core enterprises with the help of the credit radiation function of the core enterprises, and can provide high-quality financial services to the entire supply chain. This measure facilitates the financing of funds of enterprises in the supply chain, and also strengthens the flow of funds between enterprises and the ability of enterprises on the chain to resist risks. Therefore, in-depth research on supply chain finance can really effectively enhance the financing ability of building ceramics export enterprises, which is of great significance for the sustainable and healthy development of building ceramics export industry.

Therefore, the purpose of this paper is to study the method of better introducing the supply chain financial model into the building ceramics processing and export industry to improve the financing ability, integrate the capital flow into the supply

chain management, and find the cooperation space between the financial enterprises and the ceramic processing and export enterprises, which can effectively avoid the risks of financial enterprises, and also allow the ceramic processing and export enterprises to solve some of the financing difficulties, which is a realistic requirement for the realization of ceramic processing and export enterprises to enhance their financing capabilities.

Implications

(1) Theoretical significance

①Enrich relevant theoretical research. Traditional financing theories mainly focus on the impact of equity financing, bank credit and other financing methods on enterprises. As an emerging financing medium, the impact mechanism and effect of supply chain finance on corporate financing are further revealed. Through empirical analysis, research and analysis, the impact of supply chain finance on the financing ability of building ceramics export enterprises is studied, and the application and research of basic theories are deepened to understand whether supply chain finance can effectively break the information asymmetry between enterprises, improve the market competitiveness of enterprises on the chain, help win-win cooperation between enterprises, and broaden the financing channels of enterprises. Therefore, the theoretical system of supply chain finance has been enriched and developed, and the theoretical research on information asymmetry theory, competitive advantage theory, self-compensatory trade finance theory, resource horizontal integration theory, and traditional financing theory has been deepened.

②Provide theoretical support and reference for follow-up research. Traditional corporate finance theories mainly focus on the impact of the firm's own factors (such as financial status, governance structure, etc.) on the financing ability. Supply chain finance emphasizes the impact of core enterprises, financial institutions and other entities on the supply chain on the financing ability of enterprises from the perspective of the supply chain as a whole. Therefore, the study of the impact of supply chain finance on the financing ability of building ceramics export enterprises can expand the research scope of enterprise financing theory, provide theoretical support and reference for subsequent related research, and promote the in-depth and development of research in this field. At the same time, it can also provide valuable theoretical guidance and decision-making support for policymakers, financial institutions and enterprises.

(2) Practical significance

①Help solve the financing problems of building ceramics export enterprises. As an important part of China's building ceramics industry, ceramic export enterprises often face financing difficulties due to the small scale of enterprises, insufficient collateral and other reasons. As a new type of financing model, supply chain finance provides enterprises with more flexible and convenient financing services by integrating information flow, capital flow and logistics on the supply chain. Therefore, this study can help SMEs solve financing problems and provide decision-making value for enterprises.

②Promote the deep integration of finance and industry. The development of supply chain finance requires close cooperation between financial institutions and the real industry. Studying the impact of supply chain finance on the financing ability of building ceramics export enterprises will help promote financial institutions to have a deeper understanding of the operation rules and financing needs of the building ceramics industry, and then develop financial products and services that are more in line with the characteristics of the industry, and realize the deep integration of finance and industry.

Literature review

Research on the application of supply chain finance in foreign countries

(1)Research on foreign supply chain finance models. Hartley (1998) proposed a prepaid account-centric financing method, in which both the capital demander and the fund provider can share information, and the fund provider prudently issues loans according to the specific information of the transaction, and then settles with the bank after the expiration of the fund use period, which is called the prepaid account financing model^[1]. The prepaid account financing model provides a new financing channel for SMEs, but it has its own limitations. Basu (2012) solved the problem of the lag of prepaid accounts mode logistics through a stochastic dynamic programming model^[2]. Meijer et al. (2013) studied the application of supply chain finance to capital flows^[3]. Su Y (2015) argues that banks can use simulation to reduce credit risk and increase overall supply chain revenue^[4]. Ronchini Alessio et al. (2021) found that during the pandemic crisis, companies in need of liquidity increased their adoption of supply chain finance solutions, so they looked at solutions from the direction of supply chain finance based on inventory and equipment^[5]. Mitra Rony et al. (2022) used financial parameters to construct a lending model for financing enterprises in the supply chain, with 90% accuracy to distinguish whether enterprises have the ability to repay^[6].

(2)Research on the application of foreign supply chain finance. Blome and Schoenherr (2011) took eight European companies as examples to develop a set of risk assessment and control methods for supply chain finance, which has practical reference significance for supply chain finance practice^[7]. Phillip Kerle (2014) argues that supply chain finance can bring effective liquidity to enterprises, optimize the allocation of working capital, and improve efficiency through win-win results, and the risks existing in supply chain finance have been continuously valued in foreign research, and various models have been developed to measure risks^[8]. Nichapa Phraknoi et al. (2022) pointed out that the participation of SMEs in supply chain finance may lead to a potential loss of control in terms of physical and financial aspects, and it is necessary to focus on the transaction cost advantage^[9]. Miller Thomas et al. (2023) argue that supply chain finance reduces the financing cost and increases the convenience of obtaining funds for SMEs, but there are many risks associated with the use of blockchain-based

DeFi technology in supply chain finance ^[10]. Nochebuena Evans Leiza (2023) found that the shareholder response to supply chain finance is negative, but this reaction may be weakened by the increase in share buybacks by some companies, but the liquidity and profitability of companies will decrease ^[11].

Research on the application of domestic supply chain finance

(1)Research on domestic supply chain finance model: Xie Shiqing (2013) proposed three general models of supply chain finance, supply chain finance, as a new type of financial product, plays an increasingly important role in reducing logistics costs and improving economic benefits, but due to the lack of a systematic risk management system, supply chain financial risks are gradually exposed ^[14]. Luo Li (2016) proposed the concept of supply chain finance for construction machinery enterprises, hoping to provide some reference blueprints for the development of supply chain finance in China ^[15]. China's commercial banks have tried to use the innovative mechanism of supply chain finance to support small and medium-sized enterprise loans, and have achieved certain results.

(2)Research on the application of domestic supply chain finance. Song Hua, Yang Xuan, and Yu Kai (2017) found that the supply chain capabilities of SMEs can be used as an effective signal to help them reduce the level of information asymmetry with external financial institutions, and thus help them improve their financing performance. Moreover, the financing performance of the enterprise is largely determined by the evaluation of the enterprise by other network participants (financial institutions or financial service providers) outside the core supply chain of the enterprise, which can be reflected by the indicators of financing availability, financing cost, and financing flexibility of the enterprise ^[16]. Ouyang Jian (2017) argues that most Chinese scholars focus on the credit risk assessment of enterprises in the upstream and downstream of the supply chain finance industry chain and enterprises in the industrial chain around the modes of prepaid accounts and accounts receivable and inventory, focusing on the discussion of ideas, with few empirical studies and case studies, and limited guiding significance in industry practice ^[17]. Chen Sijie and Song Hua (2020) explored an effective way for SMEs to use their corporate networks and capabilities to improve their financing performance from the perspective of supply chain finance based on sample data of SMEs in 295 manufacturing industries ^[18]. Tan Jie and Yuan Dongliang (2021) believe that profitability, solvency, sales revenue, and technological innovation have a significant impact on the financing ability of small and medium-sized construction enterprises ^[19]. Xu Hui (2021) argues that the participation of upstream and downstream enterprises in supply chain finance will open up new business space for financial institutions while reducing the financing difficulty of upstream and downstream enterprises, find new profit growth points on the basis of risk control, and achieve a win-win situation for SMEs and financial institutions ^[20]. Zhang Wenbin (2021) showed that supply chain finance can effectively improve the financing performance of cross-border e-commerce SMEs, and the effect is better in cross-border e-commerce comprehensive pilot zones ^[21]. Zhou Lei, Deng Yu, and Zhang Yuyan (2021) found that the integration and empowerment of blockchain and supply chain can promote the healthy development of supply chain finance and alleviate the problem of difficult and expensive financing for small and micro enterprises ^[22]. Yu Hui and Wang Shuang (2022) found that core firms are motivated to participate in supply chain finance, and significantly prefer the inventory financing model ^[23]. Song Xiaochen and Mao Jiye (2022) found that the effective combination of blockchain reputation system and platform-based institutional mechanism can promote the construction of trust between online transaction organizations and identify the new phenomenon of "re-intermediary trust" ^[24]. Zhou Yongwu, Li Jiajian, and Zheng Xueliang (2022) found that the supply chain finance model can increase the order volume and output of the supply chain, which in turn can improve the revenue of suppliers ^[25].

Research on the ceramic industry and enterprises in the context of supply chain finance

(1)Research on the ceramic industry. Liu Yue and Li Yang (2019) believe that the growth rate of Foshan ceramic exports has become a significant reduction in recent years, and take Dongpeng ceramics as an example to demonstrate that the ceramic industry should pay attention to brand building, adjust the industrial structure, and realize the ceramic industry to move towards the high end of the value chain ^[26]. Liu Guozhen (2020) believes that ceramic exports face many problems, such as insufficient independent innovation ability, low added value of products, and lack of world brands with international influence; Ceramic enterprises have overcapacity and fierce disorderly competition, so it is recommended to speed up industrial upgrading ^[27]. Huang Hong, Xu De, and Zhang Cheng (2020) believe that affected by the epidemic, the production capacity and demand of ceramic enterprises have decreased, the capital flow of enterprises has slowed down, and the loan interest, rent, water and electricity, and employee wages of enterprises cannot be reduced at all, and the capital chain is extremely fragile and may break at any time, leading to the closure of enterprises. Moreover, the brand influence of Chinese ceramic enterprises is still insufficient, and there is still a certain gap compared with international brands ^[28]. Shu Jin (2021) believes that small and medium-sized production and processing enterprises are generally faced with the dilemma of shortage of funds but unable to find financing channels, and through the combination of theory and practical analysis, he concluded that supply chain finance financing is indeed an effective method to solve the financing problems of small and medium-sized production and processing enterprises in the current environment ^[29]. Yan Yan et al. (2021) found that commercial banks strictly control bad loans and lend prudently, so it is difficult for small and medium-sized enterprises in the stone industry to obtain financing, and in-depth research should be conducted in combination with supply chain financing services ^[30]. Wang Yan (2022) studied the spatial relationship between China's architectural ceramics industry cluster and the regional economy and its industrial collaborative innovation path, and believed that the building ceramics industry cluster is an important force for China to participate in regional or international competition, and it is necessary to improve the financing capacity and policy support of enterprises ^[31].

(2)Research on ceramic enterprises. At present, there is a big problem in building ceramics enterprises is how to obtain the favor of capital, promote the transformation and upgrading of industrial structure and promote the birth of more well-known

enterprises, and improve the competitiveness of Chinese ceramic products. In the context of this crisis, Guo Jieyun (2010) started from the research of Xiamen stone industry, conducted a systematic study on the upstream and downstream participation of supply chain finance in the stone industry, designed a set of supply chain financing plans for stone enterprises, and analyzed their risks and response strategies, providing a reference plan for the financing of building ceramics enterprises [32]. Yang Guang (2019) pointed out that small and medium-sized ceramic enterprises in Jingdezhen are small in scale, low in anti-risk ability and imperfect in enterprise system, and believes that supply chain financing and accounts receivable pledge financing involve more stakeholders and greater risks, so small and medium-sized building ceramics export enterprises dare not adopt these two financing methods because of fear [33]. Zhong Zhaohua, Feng Aoyi, and Lu Qiuping (2022) took the practice of exploring the "three-chain integration" of Foshan's architectural ceramics industry as an example to analyze the current situation of the ceramic industry chain and supply chain, and introduced the ways in which the Zhongtaolian platform solves the procurement and financing difficulties of enterprises [34].

Conclusions

The research on supply chain finance in foreign countries is relatively early, and there are many studies related to it. Although the research directions of supply chain finance are different, there is a common denominator that most of the research focuses on supply chain finance model innovation or the study of local enterprises or enterprise-related risks and indicators, and begins to pay attention to the impact of blockchain technology application on supply chain finance. Foreign researchers believe that supply chain finance, as a financial technology tool, can optimize the allocation of funds, reduce credit risk, effectively improve the financing ability of enterprises, and achieve a win-win situation. Although there are some potential points out of control, the purpose of risk control can be achieved through reasonable construction of financing models and screening of financing enterprises.

Domestic scholars believe that domestic ceramic enterprises are generally family-owned small and medium-sized enterprises, independent innovation is low brand, insufficient influence and lack of core competitiveness, disorderly competition. Building ceramics enterprises need to change this status quo, upgrade products and supply chains, reduce disorderly competition, and create more world brands with international influence. Supply chain finance binds the upstream and downstream enterprises of the supply chain together, greatly controls the cost of enterprises, and improves the anti-risk ability of the supply chain. Through internal agreement control, enterprises in the supply chain can be integrated into one large enterprise, which can jointly help industrial upgrading and reduce disorderly competition. These studies have laid a solid theoretical foundation for the research in this paper. At present, the research direction of supply chain finance is mainly in the direction of model, blockchain technology or cash flow of small and medium-sized enterprises, and the research on the impact of the building ceramics industry and financing capacity is relatively lacking, and the relevant theoretical and practical results need to be improved.

By reviewing the literature, it is found that the previous studies mainly focus on the field of ceramics, and there are few literatures that directly study the export enterprises of building ceramics, and most of the studies in the field of building ceramics are technical studies. The application of foreign supply chain finance is more abundant, and the domestic supply chain finance is less used in the research of building ceramics export enterprises, and the research of this paper can provide a certain reference for the research of building ceramics export industry and the application of supply chain finance.

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Exploring the Triangular Relationship Among Corporate Social Responsibility (CSR), Carbon Emissions, and Corporate Value: An Empirical Investigation

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Abstract

In the context of carbon neutrality, enterprises in the European Union face challenges related to greenhouse gas emissions. With increasing attention on corporate social responsibility and the impact of carbon emission intensity on corporate value, this study selected 50 large EU listed companies as the research subjects and used panel data from 2009 to 2023. A multivariate regression model was employed to empirically test the mediating effect of carbon emission intensity between corporate social responsibility and internal corporate value. The research findings indicate that corporate social responsibility influences internal corporate value, and there indeed exists a mediating effect of carbon emission intensity between corporate social responsibility and internal corporate value, with a mediating effect value of 7.996%.

Keywords : Corporate Social Responsibility; Carbon Emission Intensity; Firm Value; Mediating Effect; Listed Companies

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Introduction

This research investigates the connection among corporate social responsibility (CSR), carbon emissions, and the valuation of businesses. CSR is profoundly complex, intimately linked with every aspect of company operations and the enhancement of corporate value. As societal progress demands higher standards, the public has increasingly higher expectations for the fulfillment of CSR (Yang, 2012). Some scholars argue that CSR significantly influences corporate development and value. This is because the stock prices and market values of publicly listed companies are largely influenced by investors, who consider CSR in their investment decisions. This suggests that CSR subtly but profoundly affects company value. Moreover, (Sitompul et al., 2023) discuss the positive impact of carbon management strategies on corporate financial performance, suggesting that carbon emission data is essential not only for assessing financial risks and opportunities but also plays a significant role in the broader context of corporate governance and sustainability efforts. In light of this, this research aims to clarify the following three core questions:

Does the behavior of fulfilling corporate social responsibility positively affect its company value?

What impact does the behavior of corporate social responsibility have on its carbon emission intensity?

Does carbon emission intensity act as a mediating variable, playing a mediating effect between corporate social responsibility and company value?

As global attention to climate change intensifies, the impact of corporate carbon emission behavior and social responsibility on the capital market is becoming increasingly prominent. Although there's increasing attention, studies exploring the link between social responsibility, carbon emissions, and company worth remain limited. From existing research findings, it is evident that while corporate carbon emissions have attracted attention from both the theoretical and practical fields, research specifically focusing on the relationship between carbon emissions and corporate value remains relatively scarce. Moreover, studies on the impact of carbon emission intensity on corporate value are still in their nascent stages. Moreover, existing investigations into the connection between non-financial data disclosure and business value predominantly concentrate on environmental data sharing and its impact on company worth, paying minimal attention to carbon information. However, whether fulfilling corporate social responsibility can enhance company value has always been a hot topic of interest among scholars. Thus, this study holds significant theoretical and practical implications.

Although the existing literature presents mixed results regarding the impact of CSR on corporate financial performance, recent studies have identified a direct link between robust Environmental, Social, and Governance (ESG) disclosures and improved carbon performance in businesses. For instance, research indicates that corporate ESG disclosures can significantly enhance carbon performance, which may in turn affect corporate value (Yin et al., 2023). These findings suggest that CSR, as a

component of ESG practices, plays a crucial role in reducing carbon emissions and enhancing corporate value. This study aims to further explore the interplay between CSR, carbon emissions, and corporate value through empirical data, filling the gaps in the existing literature.

To explore the intrinsic connections between corporate social responsibility (CSR), carbon emission intensity, and corporate value, the following three topics need to be discussed: First, examine the relationships between CSR and corporate value, and between CSR and carbon emission intensity, as well as the mediating effect of carbon emission intensity between CSR and corporate value. Second, test the mediating effects while verifying whether there is a U-shaped relationship among the variables. Third, based on the results of the tests in the first two parts, engage in problem discussion and summarization.

Research Foundation and Theoretical Hypotheses

In the European Union, the monitoring and reporting of GHG emissions is governed by comprehensive regulations that ensure data consistency across member states, facilitating the collective assessment of progress towards climate goals (WRI).

Canada's approach includes detailed reporting guidelines that cover a wide array of emissions sources and processes, such as industrial operations and specific GHG sources like flaring and fugitive emissions. This allows for a granular understanding of emissions and aids in policy formation and compliance monitoring(Canada.ca).

The United States has the Greenhouse Gas Reporting Program (GHGRP) managed by the Environmental Protection Agency (EPA), which mandates annual reporting from large emission sources, fuel and industrial gas suppliers, and CO2 injection sites. This program is essential for creating a comprehensive database of emissions that supports policy development and enforcement(US EPA).

Australia's National Greenhouse and Energy Reporting (NGER) system similarly mandates the reporting of GHG emissions, energy production, and consumption data from corporations, providing a crucial foundation for the country's environmental policy and strategy (WRI).

Collectively, these reporting requirements contribute to a better understanding of global GHG emissions and help shape international efforts to address climate change through informed policymaking and effective regulatory frameworks. Such mandatory reporting is critical for tracking progress toward emissions reduction commitments under international agreements like the Paris Agreement (UL Solutions).

In this context, companies are actively taking measures to reduce their carbon emission intensity, transitioning from "high-carbon" operations to "low-carbon" operations. These actions demonstrate an improvement in corporate carbon management capabilities. Carbon management capability is a special ability of companies to coordinate their development with carbon reduction within the context of a green economy. This capability brings new opportunities and resources for corporate development, ultimately impacting corporate performance and company value.

Correlation Between Corporate Social Responsibility and Corporate Market Value

CSR as a distinctive resource of companies, can substantially influence a company's performance to a certain extent. Companies, throughout their different stages of development, have varying demands for resources but consistently strive to utilize these resources efficiently to foster development and enhance corporate value(Barnea and Rubin, 2010). However, due to potential discrepancies in information transmission, there's a likelihood that management might pursue personal gains in the guise of executing CSR, possibly leading to an excessive waste of corporate resources(Brammer and Millington, 2008, Williamson, 1963). This implies that the execution of CSR could either elevate or diminish corporate value. According to stakeholder theory, the pursuit of corporate development aims to benefit all stakeholders collectively. From a cost control perspective, engaging in CSR activities entails the consumption of human and material resources, potentially reducing corporate value(Dunfee, 2006). Conversely, from the perspective of building a corporate image, the dissemination of positive news regarding a company's CSR initiatives to the public and other stakeholders can result in an influx of economic benefits, favorably impacting corporate value(Huang and Yao, 2016).

Research on the relationship between corporate social responsibility (CSR) and corporate value primarily yields three perspectives.

The first viewpoint posits a positive correlation between CSR and corporate value. (Johnson, 2003) suggest that, to some extent, corporate engagement in social responsibility can generate wealth for the business. (Mackey et al., 2007) argue that CSR practices in publicly listed companies can maximize market value. (Chen et al., 2020), using data from Shanghai and Shenzhen stock markets, found that CSR significantly enhances corporate value. This conclusion was also confirmed by (He et al., 2020).

The second viewpoint suggests a negative correlation between CSR and corporate value. (Yang and Yang, 2016) believe that CSR implementation inevitably increases operational costs, ultimately impacting financial performance and corporate value. (Tu and Zheng, 2018) found that while CSR might decrease a company's value in the short term, it tends to increase it in the long run.

The third viewpoint argues that there is no linear relationship between CSR and corporate value. (Shan et al., 2019) observed an inverted U-shaped relationship between CSR and financial performance. Meanwhile, (Dou, 2015) notes that the impact of CSR on financial performance is minimal and that its influence on corporate value is a lengthy process. In the short term, CSR implementation requires significant resources, which can adversely affect the business; however, in the long term, the effects might be positive.

Based on the analysis above, the following hypotheses are proposed:

H1: Corporate social responsibility has a negative impact on internal company value.

H2: There is an inverted U-shaped relationship between corporate social responsibility and internal company value.

The Correlation Between Corporate Social Responsibility and Carbon Emission Intensity

Research on the relationship between CSR and carbon emission intensity is scarce. However, there is a considerable amount of research on the relationship between CSR and environmental sustainability. (Doran and Ryan, 2012) analyzed data from 2,000 Irish companies and found that increased public awareness of environmental protection and consumers' progressive perceptions of products could influence corporate green innovation. (Bitat, 2018) discovered that environmental policies could encourage companies in Germany with high environmental CSR to intensify their green innovation activities. (Hu and Zhang, 2020) focused on listed companies in China and found a reverse pushing effect between corporate environmental responsibility and green innovation. Moreover, it was observed that political-corporate connections have a negative regulatory effect on the positive correlation between corporate environmental social responsibility and green innovation. This implies that an improvement in corporate environmental social responsibility can enhance green innovation. To some extent, green innovation can reduce energy consumption and use, thereby achieving the effect of corporate carbon emission reduction. This also reflects the intensity of corporate carbon emissions.

Enterprises conscious of their social responsibility employ a variety of methods to reduce carbon dioxide emissions. On one hand, carbon emissions from corporate production can be reduced through innovative production technologies (Diamond, 2009); as the development index of capital markets increases, companies are inclined to implement carbon reduction strategies to establish a positive image, thereby diversifying risks and reducing financing costs (Shahbaz et al., 2013). Producing low-carbon green products and participating in carbon reduction projects provide companies with additional tax reliefs while alleviating external environmental policy pressures and public demands (Sprinkle and Maines, 2010).

On the other hand, the indirect carbon reduction by corporations deserves attention, namely, the corporate social responsibility actions that can inspire positive and cognitive feedback from consumers (Sen and Bhattacharya, 2001). The production of low-carbon products by companies can promote changes in the consumption patterns and lifestyles of the regional population, reflecting a high potential for emission reductions within the region. (Druckman and Jackson, 2009) also pointed out that compared to annual industrial carbon reduction targets, carbon emissions from residential activities are still growing at a rate exceeding 3% per year, and the potential for carbon reduction from changes in regional lifestyles and consumer behaviors is comparable to direct corporate reductions.

Based on the analysis above, the following hypotheses are proposed:

Ha: Corporate social responsibility has a negative impact on carbon emission intensity.

Hb: There is a U-shaped relationship between corporate social responsibility and carbon emission intensity.

The Correlation Between Corporate Social Responsibility, Carbon Emission Intensity, and Company Value

(Hu and Zhang, 2020) have indicated that CSR can have a positive impact on environmental performance and green innovation, while the emergence of green inventions can also reduce greenhouse gas emissions. This suggests that the enhancement of CSR can, to some extent, lead to a reduction in carbon emissions. Therefore, under constant conditions, the intensity of carbon emissions would also decrease. Concurrently, there is literature support for a relationship between company value and carbon emissions. (Bai and Zhang, 2019) discovered that for companies with low carbon emissions, there exists a positive link between carbon emissions and the value of a company; yet, for firms with substantial carbon emissions, a notable negative relationship is observed between their total carbon emissions and their market value. In essence, it's feasible to devise a research framework encapsulating "Corporate Social Responsibility - Carbon Emission Intensity - Company Value".

Research by (Matsumura et al., 2014) demonstrates that carbon emissions are negatively correlated with a company's market value and negatively correlated with the cost of equity capital, while positively correlated with the cost of debt capital. (Chapple et al., 2011) indicates that, compared to low-carbon emitting firms, high-carbon emitters are subjected to more severe market penalties, anticipated to affect up to 6.57% of a company's total market value. (Johnston et al., 2008) have studied capital market pricing of sulfur dioxide emission allowances held by U.S. power companies, using these allowances as a proxy. Their findings suggest that emission allowances possess asset value and real options value, but the capital market places greater emphasis on the asset value of the emission allowances.

Based on the analysis above, which suggests that carbon emission intensity has a certain impact between corporate social responsibility and company value, the following hypotheses are proposed:

H5: Carbon emission intensity mediates the relationship between corporate social responsibility and internal company value.

H6: Carbon emission intensity mediates the inverted U-shaped relationship between corporate social responsibility and internal company value.

Empirical Design

Sample Selection and Data Sources

This paper focuses on EU-listed companies. Since the CDP began distributing questionnaires to S&P 500 companies in 2007, the response rate has increased annually. Additionally, the EPA's "Greenhouse Gas Mandatory Reporting Rule" mandates that, starting January 1, 2010, suppliers of fossil fuels and industrial gases, along with vehicle and engine manufacturers, must

submit annual GHG emissions reports to the EPA. The research samples are categorized based on carbon emission intensity. Consequently, this paper utilizes data from EU-listed companies for the years 2009—2023.

Given the challenges in acquiring carbon emission data, its accuracy, and comparability, the study sample excluded companies with sparse disclosure of carbon emission data, ultimately refining and selecting 50 companies. The data for this paper primarily comes from the Eikon database, and empirical analysis is conducted using Stata.

Two main considerations were taken into account when selecting the data: first, as prominent large enterprises, if EU-listed companies cannot set an example, it is less likely to prompt action from other businesses; second, the availability of data, as the disclosure of carbon emission data is entirely at the discretion of the companies. While many are cooperative in publishing information on climate change, such as carbon emissions and reduction data, many have not responded. Therefore, companies that do not disclose carbon emission data in their social responsibility reports are not included in the scope of this study.

Variable Definitions

- 1) Explanatory variables. The internal value of a company (Tobin Q). There are many ways to measure a company's value. Some scholars, both domestic and international, use market capitalization (Market) and Tobin's Q as proxies. Following the majority of the literature, this study adopts Tobin's Q to represent the internal value of the company.
- 2) Dependent variable. Corporate Social Responsibility (CSR). Considering the accuracy and objectivity of the data, the ESG Score from Eikon is chosen.
- 3) Mediating variable. Carbon Emission Intensity (Carbon) is regarded in most social responsibility reports as the amount of carbon emissions per unit of revenue. To standardize, the data is logarithmically transformed.
- 4) Control variables. Given the numerous factors that can affect company value, the most representative indicators of a company's overall situation are selected as control variables. Specific variable selections, definitions, coding, and symbols are shown in Table 1.

Table 1 Variable Definitions

	Variable Name	Variable Symbol	Variable Definition
Explained Variables	Internal Company Value	Tobin Q	(Market value of equity + book value of total liabilities) / Book value of total assets
Explanatory Variables	Corporate Social Responsibility	Csr	ESG score
Mediating Variables	Carbon Emission Intensity	Carbon	Carbon emissions / Operating revenue ratio
Control Variables	Company Size	Size	Logarithm of total assets
	Profitability	Roe	Net profit / Average shareholder equity
	Operating Capability	Oc	Operating revenue / Total assets
	Solvency	Dpa	Operating cash flow / Total liabilities
	Development Capability	Growth	(Current period operating revenue - Previous period operating revenue) / Previous period operating revenue
	Capital Density	Cd	Operating revenue / Shareholders' equity

Model Design

To analyze the relationships among corporate social responsibility, carbon emission intensity, and company value, this paper will test the hypotheses H1, H2, Ha, Hb, H5, and H6 related to internal company value. The regression models constructed in this paper incorporate the mediating effect model method proposed by (Wen et al., 2004). The model construction for both internal and external company value is described below.

Model 1 is constructed to explore the relationship between CSR and Internal Company Value (TobinQ). Hypothesis H1 is confirmed if the coefficient a_1 of CSR is less than 0 and significant.

$$Tobin\ Q = c_1 + a_1 CSR + b_1 Controls + \varepsilon$$

To further test the inverted U-shaped relationship between CSR and Internal Company Value (TobinQ), Model 2 is constructed.

$$Tobin\ Q = c_2 + d_1 CSR + e_1 CSR * CSR + b_2 Controls + \varepsilon$$

Model a is designed to explore the relationship between CSR and Carbon Emission Intensity (Carbon). Hypothesis Ha is confirmed if the coefficient a_2 of CSR is less than 0 and significant.

$$\text{Carbon} = c_3 + a_2 \text{Csr} + b_3 \text{Controls} + \varepsilon$$

To further test the U-shaped relationship between CSR and Carbon Emission Intensity (Carbon), Model b is constructed.

$$\text{Carbon} = c_4 + d_2 \text{Csr} + e_2 \text{Csr} * \text{Csr} + b_4 \text{Controls} + \varepsilon$$

Model 5 is constructed to explore the effects of CSR and Carbon Emission Intensity (Carbon) on Internal Company Value (Tobin Q).

$$\text{Tobin Q} = c_5 + a_3 \text{Csr} + f_1 \text{Carbon} + b_5 \text{Controls} + \varepsilon$$

To further examine the mediating role of Carbon Emission Intensity (Carbon) in the inverted U-shaped relationship between CSR and Internal Company Value (Tobin Q), Model 6 is constructed.

$$\text{Tobin Q} = c_6 + d_3 \text{Csr} + e_3 \text{Csr} * \text{Csr} + f_2 \text{Carbon} + b_6 \text{Controls} + \varepsilon$$

In the models, the dependent variable Tobin Q represents the internal company value; the mediating variable Carbon is the logarithm of carbon emissions per unit of revenue, representing carbon emission intensity; the explanatory variable CSR is the total score of each company in corporate social responsibility from Eikon; the control variables, Controls, include six variables encompassing company size, capital intensity, and four capabilities. Additionally, $c_1, c_2, c_3, c_4, c_5, c_6$ are constants; $a_1, a_2, a_3, d_1, d_2, d_3, b_1, b_2, b_3, b_4, b_5, b_6, e_1, e_2, e_3, f_1, f_2$ are coefficients, and ε represents the error term.

Empirical Results and Analysis

Descriptive Statistics of Variables

From the descriptive statistics in Table 2, it can be observed that there is a significant difference between the maximum and minimum values of internal company value, at 43.63418 and 0.6212773, respectively. Corporate social responsibility scores, on a full scale of 100, range from a low of 21 to a high of 88, showing that while some companies excel in social responsibility, others need to improve their performance. Carbon intensity has a minimum value of -5.750335 and a maximum of only -0.3445928.

Table 2 Descriptive Statistics

Variable Name	Symbol	Mean	Median	Maximum	Minimum	Standard Deviation
Internal Company Value	Tobin Q	2.5052	1.4948	43.6341	0.6212	3.7148
Corporate Social Responsibility	Csr	57.1465	57.2276	88.0000	21.0000	11.8517
Carbon Emission Intensity	Carbon	-4.0975	-4.3482	-0.3445	-5.7503	0.9546
Company Size	Size	4.4586	4.4736	5.6165	2.0660	0.5468
Profitability	Roe	0.1350	0.1295	2.0625	-1.5186	0.1572
Operating Capability	Oc	0.8055	0.720	2.9494	0.0117	0.4132
Solvency	Dpa	0.2039	0.1521	2.3764	0.0006	0.2280
Development Capability	Growth	0.0394	0.0390	2.4740	-0.6701	0.2093
Capital Density	Cd	2.3601	1.8230	35.4107	0.0517	2.3165

Stationarity Test

To avoid the occurrence of spurious regression or false regression phenomena, stationarity tests were conducted on each time series in the regression analysis. Therefore, before constructing the regression model, it is necessary to test the stationarity of each variable in the model. This paper uses the Hadri test in Stata to test each variable, and the results are shown in Table 3. Each variable passed the stationarity test, indicating that the regression model can be established.

Table 3 Hadri Lagrange multiplier stationarity test

Variable Name	Symbol	z	p	Stationarity Status
Internal Company Value	Tobin Q	21.5685	0.0000	Stationary

Corporate Social Responsibility	Csr	22.7994	0.0000	Stationary
Carbon Emission Intensity	Carbon	24.5335	0.0000	Stationary
Company Size	Size	27.6327	0.0000	Stationary
Profitability	Roe	4.6426	0.0000	Stationary
Operating Capability	Oc	13.6532	0.0000	Stationary
Solvency	Dpa	12.5912	0.0000	Stationary
Development Capability	Growth	2.4861	0.0065	Stationary
Capital Density	Cd	5.7217	0.0000	Stationary

Regression Analysis

Using Stata, regression analyses were conducted on data from 2009 to 2023 to determine the impact of corporate social responsibility (CSR) on company value, the impact of CSR on carbon emission intensity, and the combined effect of CSR and carbon emission intensity on company value. Since the study uses panel data, a fixed effects model was chosen as more suitable for testing. To address the issue of panel heteroscedasticity, a weighted multiple regression model was used for empirical testing.

Internal Company Value Model Analysis

This section uses CSR as the independent variable and internal company value (Tobin Q) as the dependent variable, along with control variables, for empirical research. The empirical results are shown in Table 4.

Table 4 Tobin Q

Variables	Model 1	Model 2	Model a	Model b	Model 5	Model 6
C	-0.0156807***	-0.0096549**	-0.0287102***	-0.0277968 ***	-0.0141359***	-0.0078902
Csr	-0.0882096***	-0.1087285***	0.002647*	-0.0004635	-0.084147***	-0.1053705***
Csr * Csr		-0.0189482***		-0.0021389**		-0.0196167***
Carbon					0.4099725***	-0.1300943
Size	-1.495653***	-1.514034***	-0.2354363***	-0.2373162***	-1.420335***	0.4119197***
Roe	0.017682***	0.0176685***	0.007064***	0.0069497***	0.0142226 ***	-1.439007***
Oc	0.5174813***	0.5069852***	-0.1577015***	-0.1584492 ***	0.5701675***	0.0141921***
Dpa	0.0085815**	0.0072957	0.0050919 ***	0.0051726 ***	0.003902	0.5595513***
Growth	0.0136802***	0.0147142***	-0.01821 ***	-0.0181635***	0.0230512 ***	0.0241662***
Cd	0.1124401***	0.1123891***	0.0084516	0.0083952***	0.1097712 ***	0.1097057***
R ²	0.4968	0.4975	0.2609	0.2611	0.5022	0.503
Adj. R ²	0.4951	0.4958	0.2585	0.2588	0.5005	0.5012
F-statistic	4.533	4.31	16.071	16.17	4.444	4.229
Wooldridge Test	0.2437	0.2471	0.6013	0.6102	0.2549	0.2582

Model 1 tests the impact of Corporate Social Responsibility (CSR) on corporate internal value. The empirical results show a significant relationship in Model 1, with a CSR coefficient of -0.0882096, indicating a negative correlation between CSR and corporate internal value. Hence, Hypothesis 1 (H1) is supported. Model 2 incorporates the variable CSR*CSR and displays significant results. However, this model does not support Hypothesis 2 (H2), indicating that there is no inverted U-shaped relationship between CSR and internal company value. Instead, as CSR activities increase further, their negative impact on company value intensifies. This could be due to lukewarm or negative reactions from the market and consumers towards the company's CSR initiatives, or a perception that these activities are insufficient to offset other negative business practices. Therefore, even with increased CSR efforts, company value may decline.

Model a examines the impact of CSR on carbon emissions intensity. The significant results indicate that CSR positively correlates with carbon emissions intensity, with a CSR coefficient of 0.002647. The increase in CSR activities significantly impacts carbon emission intensity. The significant positive coefficient indicates that as CSR activities increase, carbon emission intensity slightly rises. This may reflect that initial CSR activities lead to increased carbon emissions due to the use of additional resources, such as the implementation of new environmental equipment or technologies. Model b, compared to Model a, incorporates the variable CSR*CSR. The empirical results show that the relationship is not statistically significant, and thus Hypothesis Hb does not hold, indicating that there is no U-shaped relationship between corporate social responsibility (CSR) and carbon emission intensity.

Model 5 tests the effects of Corporate Social Responsibility (CSR) and carbon emission intensity on the internal value of the company. Empirical results indicate that CSR has a significant negative correlation with internal corporate value, with a coefficient of -0.084147, $p < 0.05$. Simultaneously, the coefficient for carbon emission intensity (Carbon) is 0.4099725, significantly positive, possibly reflecting that higher carbon emissions are associated with higher levels of industrial activity and economic benefits. Additionally, the adjusted R-squared for Model 5 is 0.5005, an improvement from Model 1's 0.4951, indicating a good fit of the data. Model 6 introduces the CSR * CSR interaction term and finds that the empirical results are not significant, thus Hypothesis 6 (H6) does not hold.

Following the mediation effect testing method of (Wen et al., 2004), the comparison is as follows:

Step one: The coefficient a1 in Model 1 is significant

Step two: The coefficient a2 in Model a is also significant

Step three: The coefficient a3 in Model 5 is significant.

Therefore, the mediation effect of carbon emission intensity is classified as a “partial mediation effect”, thus Hypothesis 5 (H5) holds. The proportion of the mediation effect of carbon emission intensity in the total effect is shown in Table 5.

Table 5 Testing the mediating effect of carbon emission intensity

Model	Standardized Regression Equation	Regression Coefficient Test
Model 1	$y = -0.0882096 x$	SE=0.0078316 ; $t=-11.26^{***}$
Model 5	$m = -0.2052x$	SE=0.0077956 ; $t=-10.79^{***}$
Model 7	$y = -0.0319659x$ $- 0.0343736m$	SE=0.0045156 ; $t=-7.08^{***}$ SE=0.0213124 ; $t=-1.61$

The proportion of the mediation effect in the total effect is calculated as $= 0.2052 \times 0.0343736 / 0.0882096 = 7.996\%$, meaning the mediation effect accounts for 7.996%. This research on the impact on corporate internal value introduces an additional pathway beyond the "Corporate Social Responsibility—Corporate Internal Value" relationship, namely "Corporate Social Responsibility—Carbon Emission Intensity—Corporate Internal Value". On one hand, corporate social responsibility has a direct negative effect on corporate internal value; companies with greater CSR engagement tend to see a reduction in their value to some extent. On the other hand, corporate social responsibility indirectly negatively affects company value through corporate carbon intensity. This implies that companies that engage more in corporate social responsibility activities tend to increase their carbon emission intensity, which in turn leads to an increase in company value.

The scenario where CSR activities lead to an increase in carbon emissions may reflect the complexity and diversity inherent in executing corporate social responsibility strategies. Although CSR is generally intended to enhance a company's social and environmental impact, if these measures are primarily focused on non-environmental areas, such as community development or improving employee welfare, without adequately considering their environmental costs, it can result in increased energy usage and higher carbon emissions. This phenomenon highlights the need for companies to comprehensively consider both the direct and indirect environmental impacts when formulating and implementing CSR activities, to ensure that these measures not only meet social responsibility goals but also sustain environmental viability.

Conclusions and Policy Recommendations

Conclusions

This paper investigates the relationship between corporate social responsibility, carbon emission intensity, and company value using data from 50 EU-listed companies spanning from 2009 to 2023. The study concludes by drawing insights from the findings.

The analysis of internal company value yielded the following results: First, there is a significant mediating effect of carbon emission intensity between corporate social responsibility (CSR) and internal company value. This suggests that CSR can substantially influence internal company value through the intensity of carbon emissions. Second, there is a significant negative correlation between CSR and internal company value. Third, there is a positive correlation between CSR and carbon emission intensity in large enterprises.

In exploring the relationship between corporate social responsibility (CSR) and company value, this study has yielded results that differ from those of some scholars. A possible reason for this discrepancy is that while the fulfillment of environmental CSR can enhance green innovation and reduce environmental damage, it also increases corporate costs. Particularly when using Tobin's Q as an indicator of internal company value, an increase in costs may not immediately lead to an increase in returns, thus affecting the actual output efficiency of assets, i.e., the ratio of market value to asset cost, resulting in a decrease in Tobin's Q value, which reflects a decrease in internal company value. In addition, this research examines the interrelationships among corporate social responsibility, carbon emission intensity, and company value together, finding that carbon emission intensity mediates the relationship between CSR and company value. Integrating related theories, the relationship "CSR—carbon emission intensity—company value" can be easily explained.

The quality of a company's development cannot be assessed in isolation. Compared to financial performance, one cannot deny the importance of environmental awareness in carbon management, nor can one ignore the economic benefits brought by high carbon-emitting companies, which simultaneously pose risks to our environment. For long-term effective development of both the economy and the ecology, companies should actively fulfill their CSR obligations. Only by not sacrificing the environment for economic growth can we achieve global sustainable development.

Policy Recommendations

As times progress, the public has set higher expectations for companies to fulfill their corporate social responsibilities (CSR). It is a trend for companies to undertake CSR, but overdoing it can inevitably lead to a decrease in company value. There is still much debate about the impact of carbon reduction on company value, and the disclosures and effects of many companies' carbon reduction have not been adequately verified. Therefore, the management of carbon emissions should not be limited only to the reduction of carbon emissions; more emphasis should be placed on reducing carbon emission intensity.

Countries need to unite and collaborate, sharing the responsibility and mission of carbon reduction. Companies should fulfill their social responsibilities appropriately, intensify efforts towards low-carbon emission reduction, and ultimately achieve sustainable development.

Further Recommendations

Measuring a company's CSR encompasses many aspects, such as social responsibility involving employee welfare and working environment. This part may weaken the mediating effect of carbon emission intensity. Future research could break down CSR into multiple components for separate investigation.

This study chose Tobin's q as the internal value measurement indicator because internal financial data are generally more accessible, especially for listed companies. These data are highly consistent and standardized, which facilitates time-series analysis and horizontal comparisons. Subsequent research could focus on external values, which typically include market share, brand value, customer satisfaction, etc. These indicators can comprehensively reflect a company's market position and brand influence from multiple perspectives—a comprehensiveness that internal financial indicators fail to provide, especially in assessing the social and environmental effects of CSR activities. For convenience in future research, this paper also provides data on external values for further study.

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The Ghostly Ethics of Mediatized Shaping: Cultural Memory and Creative Transformation of Anhui's ICH in Reviving the Craftsmanship

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Abstract

This study examines the creative transformation of intangible cultural heritage (ICH) in the digital age, focusing on the case of the Chinese TV program *Reviving the Craftsmanship*. By analyzing the show's practices through the dual lens of mediatized memory construction and techno-ethical negotiation, the research identifies three key mechanisms: super-visual encoding, cross-platform narratives, and ethical negotiations. Super-visual encoding transforms the embodied practices of ICH into spectacular visual symbols, enhancing the appeal of cultural memory while simultaneously leading to the "effacement of the body" of ICH's ontology. Cross-platform narratives leverage algorithmic logic to promote the fragmented dissemination of ICH, increasing public engagement but also commodifying it, resulting in fragmented memory and the demise of users' critical subjectivity. Ethical negotiations attempt to strike a balance between technological innovation and cultural preservation, utilizing concepts like the "ghostly contract" and the "mediatized ethical assessment matrix" to constrain the potential misuse of technology. This study constructs a critical theoretical framework of mediatized shaping, which reframes "creative transformation" as a tension-filled process and reveals the power relations and ethical dilemmas embedded within. Moving beyond the simplistic "protection/development" dichotomy, the research highlights the complexities of safeguarding and transmitting ICH in the digital era, and calls for a responsible and sustainable model of mediatized heritage transmission.

Keywords : Intangible Cultural Heritage (ICH); Mediatized Shaping; Cultural Memory; Creative Transformation; Ghostly Technology Ethic

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Introduction

The preservation of Intangible Cultural Heritage (ICH) faces a critical juncture in the contemporary era. While traditional modes of transmission, reliant on embodied practices and intergenerational learning, are demonstrably waning, the pervasive influence of media technologies offers a seemingly viable, yet inherently complex alternative. This tension is particularly evident in China, where rapid modernization and urbanization pose significant challenges to the survival of ICH. For instance, a report by the China Intangible Cultural Heritage Protection Center (2019) highlighted the aging demographic of ICH practitioners nationwide, coupled with a declining interest among younger generations in pursuing traditional crafts. This trend is exemplified in Anhui Province, a region renowned for its rich cultural heritage.

Against this backdrop, media interventions have emerged as a potential avenue for sustaining ICH. A prominent example is the television variety show *Reviving the Craftsmanship* (活起来的技艺, *Huó Qǐlái De Jìyì*), produced by Anhui Broadcasting Corporation and aired since 2021. This program, now in its fourth season and co-produced with the Anhui Intangible Cultural Heritage Protection Center, represents a concerted effort to revitalize ICH through mediatization. Each episode of *Reviving the Craftsmanship* focuses on a specific city within Anhui Province, showcasing its unique ICH through a combination of cultural exploration, hands-on demonstrations of traditional techniques, and discussions with inheritors. The show employs a variety of engaging formats, including on-location filming at heritage sites, studio segments with expert commentary, and the incorporation of dramatic re-enactments to bring historical context to life. For instance, the episode dedicated to Huizhou showcased traditional wood carving techniques through micro-photography, while the episode on Wuhu featured slow-motion captures of iron painting forging. Furthermore, the show actively promotes audience engagement through interactive elements, such as QR code-based quizzes and social media campaigns.

Reviving the Craftsmanship thus serves as a compelling case study for exploring the multifaceted role of media in contemporary ICH preservation. However, the show's approach also raises crucial questions about the nature of authenticity and the potential pitfalls of commodification when traditional practices are translated into mediated forms. Traditional approaches to ICH often equate "living heritage" with "embodied practice," privileging the physical transmission of skills while often overlooking the role of technological mediation (Kirshenblatt-Gimblett, 2004). This paper challenges this limited

paradigm and argues that the mediatized shaping of cultural memory has become an indispensable condition for the continued existence of ICH. Mediatized shaping, as a core concept of this paper, refers to the process by which media technologies actively participate in the construction and reconstruction of cultural memory, rather than simply recording or transmitting it. It highlights the transformative power of media, emphasizing that media representation is not a neutral reflection of reality but an active force that shapes our understanding and experience of the world, in this case, of ICH. This concept challenges the dichotomy between "protection" and "development" that often dominates ICH discourse, suggesting that mediatization is not merely a tool for either, but a fundamental process that reshapes the very nature of ICH.

Drawing on Derrida's concept of "hauntology" (1994), we propose that media technologies do not simply replicate existing practices but invoke a ghostly presence of tradition, altering its essence and perception. This ghostly presence is not a mere copy, but a reinterpretation shaped by media's affordances. Hauntology, in this context, helps us understand how the televised representation of ICH, for instance, is not simply a documentation of the "real" practice but an evocation of a past that never truly existed in its mediated form. The televised ICH is a "specter," a "ghost" of the tradition, simultaneously present and absent, familiar and unfamiliar. Extending Stiegler's notion of "pharmakon" (1998), wherein technics function as both remedy and poison, we conceptualize media as simultaneously revitalizing and potentially undermining the fabric of ICH. Stiegler's "pharmakon" illuminates the dual nature of media technologies in the context of ICH. On one hand, media can act as a "remedy" by expanding the reach of ICH, attracting new audiences, and potentially revitalizing interest in endangered practices. On the other hand, it can act as a "poison" by simplifying, decontextualizing, and potentially distorting ICH for the purposes of mass consumption. This perspective moves beyond instrumentalist views of media as neutral tools and instead interrogates its constitutive role in shaping cultural memory, as discussed by Couldry and Hepp (2017).

Consequently, this study undertakes a critical examination of how ICH-focused variety shows like *Reviving the Craftsmanship* engage in a dynamic interplay of technology, memory, and power to achieve creative transformations. The central research question is refined as follows: How does the mediatized shaping of ICH, as exemplified by *Reviving the Craftsmanship*, reconfigure the interplay between cultural memory, tradition, and authenticity in the context of contemporary China? To address this, we adopt a framework combining critical mediatization theory (Hepp, 2020) with hermeneutic case study analysis. This dual approach allows us to scrutinize the mechanisms through which media, particularly television, reconfigures ICH's symbolic and material dimensions. By examining the specific strategies employed in *Reviving the Craftsmanship*, we aim to unmask the hidden power dynamics, ethical contradictions, and potential ideological influences inherent in the digital remediation of ICH. This includes a critical analysis of how the show's production and dissemination might be influenced by commercial interests, government policies, and dominant cultural narratives, potentially leading to the marginalization of certain voices and perspectives within the ICH ecosystem. Ultimately, this study contributes to a more nuanced and critical understanding of the contemporary manifestations and future possibilities of ICH.

Super-Visual Encoding: The Symbolic Reconstruction of Cultural Memory and the Effacement of the Body

In the current era dominated by technical images, the representation of cultural memory is undergoing profound transformations. Unlike traditional handcrafted images, technical images are produced through technological means, fundamentally altering how we perceive and remember the world. In the context of ICH, this transformation manifests specifically in the translation of tacit, embodied knowledge into visually dominant symbolic codes. The use of high-definition cameras and microscopic lenses abstracts the tactile experiences of artisans into spectacular visual extravaganzas, shifting from a tactile, experiential mode of transmission to a visual one. This shift is further complicated by the concept of "simulacrum," as Baudrillard (1994) elucidates in *Simulacra and Simulation*. The simulacrum is not merely a copy of the real but a "hyperreality," a simulation that is "more real than real." In programs like *Reviving the Craftsmanship*, hyperreal representations of ICH may overshadow and supplant the authentic practices they purport to represent. This creates a state where the copy precedes and replaces the original, a core issue for the survival of ICH in the age of hyper-mediation (Flusser, 2011; Baudrillard, 1994).

The Politics of Memory in the Era of Technical Images and the Effacement of the Body

Understanding the changes in cultural memory within a mediated environment necessitates an in-depth examination of the role of "technical images" in shaping collective cognition. Flusser (2011), in *Into the Universe of Technical Images*, argues that the uniqueness of technical images lies in their production by machines rather than human hands, leading to a fundamental shift in the logic of image production and perception. The mode of production of technical images enables an unprecedented level of attention to detail, yet this can also lead to a neglect of the overall context. For example, in *Reviving the Craftsmanship*'s presentation of Huizhou woodcarving, the program utilizes microphotography to capture intricate details of the carving process, such as the texture of the wood as the knife glides across it and the fine spray of wood shavings. This presentation of micro-details constructs a spectacle of "microscopic fetishism" in the audience's gaze, directing their attention to the "worship" of details while obscuring a deeper understanding of the broader cultural and social context behind the woodcarving. As Baudrillard argues, this "fetishistic" focus on details transforms the technical images themselves into objects of consumption rather than as a medium for understanding ICH.

The analysis of "technical images" also reveals the gradual effacement of the "body." In traditional apprenticeship models, learners acquired skills by observing the master's physical movements and receiving hands-on guidance. However, on the television screen, the artisan's body is often reduced to a pair of "skilled hands" or hidden behind the technical images. For

instance, in *Reviving the Craftsmanship*, the camera rarely presents the artisan's full body, focusing instead on their hand movements and the interaction between tools and materials. This "decontextualization" of the body transforms the transmission of ICH into a "disembodied" visual experience. The audience sees only a series of actions framed and edited by technical images, without being able to feel the fatigue of the artisan's body, the temperature of the craft, and the emotional connection between master and apprentice.

Benjamin's (1968) concept of the loss of "aura," presented in *The Work of Art in the Age of Mechanical Reproduction*, helps us understand the impact of this "effacement of the body." "Aura" refers to the unique, non-reproducible characteristics of an original work of art, closely linked to its history, tradition, and ritualistic nature. In the age of mechanical reproduction, the mass production and dissemination of technical images lead to the gradual disappearance of the "aura," replaced by a standardized, reproducible "copy" experience. In the context of ICH, the presence of the "body" is an important component of the "aura," and the effacement of the "body" by technical images accelerates the disappearance of the "aura," posing risks of "dehistoricization" and "decontextualization" to the transmission of ICH.

Further analysis reveals that technical images are not neutral mediums but manifestations of power relations. Who produces, disseminates, and consumes these images, and how they are used, have a profound impact on the formation of cultural memory. In the case of ICH, television programs and social media platforms become important sites for these power dynamics. As Couldry and Hepp (2017) argue in *The Mediated Construction of Reality*, mediatization is not a neutral process but a field of power operations. These platforms use algorithms and dissemination strategies to shape audience perception, making them more receptive to meticulously designed visual spectacles while neglecting more complex and nuanced aspects, such as the cultural context, social functions, and ethical implications of ICH. For example, the presentation of certain ICH items in *Reviving the Craftsmanship* may be influenced by factors such as sponsors and ratings, leading to a preference for projects that are more visually impactful and easier to attract viewers, while neglecting those that are less "photogenic" but equally important in cultural value (Van Dijck, 2013; Fuchs, 2024). This selective presentation is, in fact, an operation of power that determines which ICH items can enter the public eye and which are marginalized.

In conclusion, the politics of memory in the era of technical images reveals a power dynamic whereby media technologies, through their inherent logic of viewing and expression, transform the embodied practices of ICH into abstract visual symbols, thereby changing the nature and transmission of cultural memory. This is not only a new way of presenting ICH but a reshaping of cultural memory itself. This reshaping tends to emphasize visual impact and sensory stimulation, sacrificing the depth and complexity of ICH. As Debord (2014) critiques in *The Society of the Spectacle*, contemporary society has become a "society of the spectacle," where everything is transformed into images for viewing and consumption. In the process of the mediatization of ICH, we also need to be wary of this trend of "spectacularization," to avoid simplifying ICH into a purely visual consumable. This critical perspective provides an important theoretical foundation for subsequent analyses.

The Symbolization of Craft: The Mediatized Translation of ICH under Super-Visual Encoding

In the process of mediatization, the traditional skills of ICH are often transformed into various visual symbols to adapt to the logic of contemporary media dissemination. This process of symbolization is not a simple replication of reality, but rather a complex re-encoding that, while giving ICH a new form of representation, also subtly alters its intrinsic meaning and value. Television programs like *Reviving the Craftsmanship* are typical examples of this process. In order to attract the audience's attention, the program often adopts strategies of super-visual encoding. For instance, it widely uses microphotography to present the details of ICH craftsmanship. Textures and marks, originally requiring tactile experience, are transformed into clear, delicate, and visually impactful images. One can imagine, in an episode, when the camera focuses on the carving knife in the hands of a Huizhou woodcarving artisan, the millimeter-level precision is magnified to its utmost on the screen. This extreme presentation of detail constructs a visual spectacle of "microscopic fetishism," drawing the audience's attention to the "worship" of the details of craftsmanship. Viewers marvel at these microscopic details and often simplify the ICH craftsmanship into a symbol of "exquisite craftsmanship," neglecting the profound cultural connotations and historical heritage behind it. Although specific statistics may vary depending on the year of the program's broadcast and the specific audience, ample user feedback can support this observation: viewers express their awe at the visual presentation but rarely explore the cultural context behind the craft.

In addition to microphotography, slow-motion and close-up shots are also commonly used techniques in the program, which are used to enhance certain specific production processes, creating a "ritualized" atmosphere. Take the presentation of iron painting forging as an example. The sparks generated during the forging process, fleeting under normal speed, are stretched out in slow-motion shots of hundreds of frames per second. The trajectory of the sparks and the deformation of the iron are clearly visible. The forging process, originally full of power and speed, is transformed into a "visually poetic" performance. At the same time, with specific editing and music, the image of the craftsman is often portrayed as more heroic, each strike of the hammer imbued with a sense of sacred mission. Although this "ritualization" of ICH craftsmanship enhances the ornamental value of the program, it may also lead to an idealized understanding of ICH by the audience, neglecting the real labor process and the various practical challenges faced by craftsmen. For example, online, praise for the "craftsman spirit" of ICH is common, but few people pay attention to the economic pressures and social recognition issues faced by ICH inheritors, and few viewers further consider the potential occupational health hazards of long-term, high-intensity work.

Thus, through super-visual encoding, programs like *Reviving the Craftsmanship* successfully transform ICH craftsmanship into eye-catching visual symbols, but this translation is also accompanied by the obscuration of the intrinsic value and simplification of the meaning of ICH. While enjoying the visual feast, the audience may regard ICH as a consumable "spectacle" and ignore its original form as a way of life and cultural tradition. As Lister et al. (2009) point out in *New Media: A*

Critical Introduction, the development of new media technologies has made the production and dissemination of images more convenient but has also exacerbated the trend of commodification and spectacularization of images. Mirzoeff (2011) further points out in *The Right to Look* that visual culture studies need to focus on the power relations behind vision and how vision is used to construct and maintain social order. In the process of the mediatization of ICH, we also need to reflect on the power logic behind this visual presentation and how it affects our understanding and cognition of ICH. McLuhan's (2003) notion of "the medium is the message" in *Understanding Media* also reminds us that the form of the medium itself will affect the content of the message. As in the television medium, the form of super-visual encoding is not neutral; while presenting ICH, it also selects and reconstructs it to make it more in line with the logic of media dissemination and the aesthetic expectations of the audience. It is this interaction between media form and content that we need to focus on when analyzing the mediatization of ICH. What we need to be wary of is whether this excessive visualization and symbolization will dissolve the cultural connotations of ICH, reducing it to a hollow visual symbol.

Intangible Cultural Heritage as "Disembodied Symbols": A Critical Reflection on Super-Visual Encoding

Analysis of programs like *Reviving the Craftsmanship* reveals that the medial translation of super-visual encoding is not merely a technological operation but a profound transformation of ICH. This media-driven mode of dissemination simplifies the complex dimensions of ICH, including its material practices, embodied experiences, and social connotations, into visually dominant symbolic representations, which, to a certain extent, diminishes the cultural richness of ICH. As emphasized by the concept of "mediatized shaping," media are not neutral tools but actively participate in the construction of cultural memory, exerting a substantial influence upon it. Here, we will further reflect on the challenges posed by super-visual encoding to the transmission of ICH, particularly the dissolution of "embodiment" and the flattening of cultural memory.

In the narrative of super-visual encoding, the artisan's body is no longer the core of ICH practice but instead becomes an object of the gaze. Although the details of knife work under a microscopic lens and the sparks of forging in slow motion attract audiences with their exquisite display of technique, they also obscure the central role of the artisan's body in the practice of the craft. The audience sees visual spectacles processed by media technologies, but they cannot experience how artisans perceive the texture and quality of materials through their bodies, how they hone their skills through daily labor, and how they integrate their own experiences, emotions, and aesthetics into the creation of ICH. This neglect of bodily experience confines the audience's understanding of ICH to the visual level, severing their connection with the cultural emotions and local knowledge embedded behind the heritage. As Merleau-Ponty (2002) emphasizes in *Phenomenology of Perception*, the body is not merely a physical existence but the medium through which we perceive and interact with the world. The transmission of ICH is not only the transmission of skills but also the transmission of embodied experience. Shusterman (2012) also points out in *Thinking Through the Body* that body aesthetics emphasizes the importance of the body in aesthetic experience, and many subtleties in traditional crafts can only be inherited through bodily perception and practice. The obscuring of the artisan's body by super-visual encoding is, in fact, a dissolution of the "embodiment" in ICH transmission. This dissolution not only affects the audience's understanding of ICH but may also have a negative impact on the mode of ICH transmission.

Furthermore, the intervention of algorithmic logic exacerbates the flattening of ICH memory. On social media platforms, in order to cater to users' attention, short videos and images about ICH are often simplified into fragments of information. These fragmented pieces of information often lack historical depth and cultural context, resulting in the meaning of ICH being reduced to visual symbols for rapid consumption. For example, a short video of a dozen seconds showcasing an ICH skill may only capture the most eye-catching 片段, while neglecting the complex processes and cultural connotations behind it. This "decontextualized" mode of dissemination deprives the cultural memory of ICH of its due richness and complexity. At the same time, the recommendation mechanism of algorithms allows these symbolized ICH contents to be massively reproduced and disseminated, further undermining the uniqueness of ICH. Benjamin's (1968) concept of "aura," presented in *The Work of Art in the Age of Mechanical Reproduction*, helps us understand the loss of this "uniqueness." "Aura" is closely connected to the authenticity, historicity, and ritual nature of a work of art. However, with the advancement of media technology, the "aura" of ICH is also facing the danger of disappearance. As Anderson (2006) argues in *Imagined Communities*, the development of print capitalism fostered the rise of nationalism because it enabled the large-scale, standardized dissemination of information. In the algorithmic age, digital capitalism further promotes the commodification and fragmentation of cultural memory, putting ICH at risk of being homogenized and vulgarized.

In conclusion, a critical reflection on the super-visual encoding in programs like *Reviving the Craftsmanship* shows that the impact of media technology on ICH is profound and complex. Although super-visual encoding enhances the visibility of ICH, it also brings about problems such as the dissolution of "embodiment" and the flattening of memory. Simplifying ICH into "disembodied symbols" and neglecting its profound cultural connotations and ethical implications may lead to the "hollowing out" of ICH transmission. Being mindful of the logic of algorithms can further guide us to consider how to protect and transmit the uniqueness and historicity of ICH in the digital age, preventing it from becoming a victim of the logic of digital capitalism. These analyses provide an important theoretical foundation for our subsequent exploration of the fragmentation of memory in cross-platform narratives and the cultural exploitation of digital capitalism.

Cross-Platform Narratives: Memory Fragmentation and the Cultural Exploitation of Digital Capitalism

If super-visual encoding primarily focuses on the symbolic reconstruction of ICH through technical images, cross-platform narratives further reveal how digital platforms incorporate the cultural memory of ICH into the operational logic of digital capitalism. Driven by the attention economy, digital platforms, especially short-video platforms, tend to segment ICH content into easily consumable "time-objects," thereby accelerating the fragmentation of ICH memory. This fragmented memory not only dissolves the historical depth of ICH but also gradually transforms it into a consumable "sublime object." More importantly, by encouraging users to generate content (UGC), digital platforms transform users into unpaid digital laborers, further exacerbating the cultural exploitation of ICH and the exploitation of user labor.

The Memory Colonization of the Attention Economy

Understanding the dissemination mechanism of ICH on digital platforms requires an examination of how the attention economy influences the production and consumption of cultural memory. In the era of the attention economy, users' attention has become a scarce resource, and digital platforms compete to capture this scarce resource. Stiegler (2010), in *For a New Critique of Political Economy*, points out that digital platforms control users' attention through "memory industrialization." "Memory industrialization" refers to the segmentation, packaging, and commodification of cultural content to adapt it to the dissemination patterns of digital platforms. This "memory industrialization" not only accelerates the commodification of cultural memory but also weakens people's ability to critically reflect on history and cultural traditions. On digital platforms, ICH content is often simplified into short, eye-catching clips to cater to the recommendation logic of algorithms and users' browsing habits. For example, a complex ICH skill may be reduced to a few "highlights" on short-video platforms, while the historical and cultural information behind it is ignored. This fragmentation of ICH content turns the transmission of ICH into a "decontextualized" dissemination, and the cultural memory of ICH thus loses its due depth and breadth.

Under the logic of digital capitalism, the cultural memory of ICH is further commodified. Žižek's (1989) concept of the "sublime object," presented in *The Sublime Object of Ideology*, can help us understand this commodification mechanism. According to Žižek, the "sublime object" refers to objects that are endowed with extraordinary value but whose intrinsic value is elusive. On digital platforms, ICH is often packaged as a "sublime object" with a sense of "mystery" and "exoticism" to attract users' attention. For example, a short video about an ICH skill may use exquisite visuals, unique perspectives, and engaging music to shape ICH into an object that is both desirable and unattainable. This "sublimation" of ICH, while able to attract a large amount of traffic in a short period, also obscures the essence of ICH as a cultural practice, transforming it into a consumable symbol. More importantly, in this process of "sublimation," the cultural connotations and ethical values of ICH are often stripped away, leaving only its superficial value as a symbol, thus reducing it to a commodity under the logic of digital capitalism.

Furthermore, digital platforms further strengthen the cultural exploitation of ICH by encouraging users to participate in content production. Users contribute data and traffic to the platform while watching, commenting, forwarding, and imitating ICH content, but this "participatory labor" is often unpaid. Terranova (2000), in "Free Labor: Producing Culture for the Digital Economy," points out that an important feature of digital capitalism is the exploitation of user-generated content. Users' active behavior on social media creates huge commercial value for platforms, but users themselves rarely receive direct economic returns. This "participation as exploitation" model makes digital platforms the biggest beneficiaries in the dissemination of ICH, while the inheritors and ordinary users who truly create the value of ICH are often marginalized.

The Commodification of Memory under Algorithmic Logic

In the age of digital platforms, algorithms play a crucial role, not only determining how information is disseminated but also profoundly influencing users' understanding and perception of ICH. As mentioned earlier, digital platforms tend to fragment ICH content to cater to users' attention spans and the recommendation logic of algorithms. This trend is particularly evident on short-video platforms represented by Douyin. By observing the dissemination of *Reviving the Craftsmanship* on different platforms, we can find that algorithmic logic further promotes the commodification of ICH cultural memory and transforms it into a tool for digital capital accumulation.

A typical phenomenon is that on platforms such as Douyin, short videos about ICH skills are often edited into extremely short "highlight moments" in pursuit of maximum visual impact and dissemination effectiveness. For example, videos about She inkstone carving techniques are often condensed into 15-second clips on Douyin. These clips usually only show the moments in the carving process that are most likely to trigger sensory stimulation, such as the crisp sound of the knife tip gliding across the inkstone or the visual effect of ink spreading on the inkstone surface. Although these short videos are very effective in attracting users' attention and may achieve hundreds of millions of views in terms of data, they sacrifice the integrity and cultural connotation of the ICH craftsmanship. In this fragmented viewing experience, the audience often simplifies the value of She inkstone into a kind of "de-stressing tool" while ignoring the profound historical and cultural heritage it carries as one of the Four Treasures of the Study. User surveys also show that after watching these short videos, many users' impression of She inkstone is limited to the sensory experience of "de-stressing," while they know little about its cultural function and historical inheritance. As Bucher (2018) points out in *If...Then: Algorithmic Power and Politics*, algorithmic logic tends to push content that maximizes user engagement, which is often related to the entertainment value rather than the educational value of the content.

In addition to the fragmentation of ICH content, digital platforms also encourage users to participate in the reproduction of ICH content in various ways, thereby transforming users into "prosumers." For example, *Reviving the Craftsmanship* once launched "ICH challenge" activities on Douyin, attracting a large number of users to participate in the creation. On the surface, these activities seem to promote the dissemination and promotion of ICH, but in fact, they imply the exploitative logic of

digital capitalism. First, when users participate in these activities, they often need to invest a lot of time and energy to create content, but the ownership and right of revenue of this content are mostly owned by the platform. Secondly, the platform classifies and filters these user-generated content (UGC) through algorithms. Those contents that are more in line with the platform's tone and have more entertainment value are more likely to gain exposure and traffic, while those contents that truly have inheritance value may be marginalized. For instance, in the "willow weaving DIY challenge," despite attracting millions of users, most of the content leaned more towards entertainment, with few users genuinely exploring the cultural connotations and inheritance lineage behind the willow weaving craft. This kind of guidance and filtering of user participation is actually a kind of data exploitation. The platform accumulates its own data assets and commercial value by gratuitously occupying users' creative labor, thus transforming users into "digital laborers." Zuboff (2019), in *The Age of Surveillance Capitalism*, profoundly reveals the essence of this data exploitation. She points out that in the era of digital capitalism, user data has become a new means of production, and platforms collect and utilize this data through various means to maximize their own interests.

In conclusion, under the dominance of algorithmic logic, the cultural memory of ICH shows a trend of commodification on digital platforms. This commodification is not only reflected in the simplification of ICH into consumable visual symbols but also in the unpaid appropriation and exploitation of user-generated content. Through algorithmic filtering and guidance, digital platforms incorporate the cultural memory of ICH into the logic of digital capital accumulation, thereby exacerbating the cultural exploitation of ICH. This trend not only brings new challenges to the inheritance of ICH but also makes us reflect on the ethical issues of cultural production and consumption in the digital age.

The Fragmentation of Memory and the Demise of Critical Subjectivity

In the context of cultural dissemination dominated by digital platforms, the cultural memory of ICH not only faces the risk of commodification and fragmentation but also further suffers the dissolution of its historical depth, reducing it to a "decontextualized" cultural fast food. In this mode of cultural consumption, users often only have access to fragmented pieces of ICH, unable to deeply understand the cultural context and historical significance behind it. More seriously, digital platforms transform users into seemingly active "digital laborers" in cultural production, but this unpaid participation exacerbates the symbolic alienation of ICH, forming a paradox of "participation as exploitation." In this paradox, users seem to gain opportunities to participate in cultural heritage transmission and engage in cultural expression but, in reality, they unknowingly become tools of digital capitalism, and their critical subjectivity gradually disappears.

The operational logic of algorithmic recommendation tends to display content that is easy to disseminate, easy to understand, and able to quickly attract user attention, while those cultural elements of ICH that require in-depth interpretation and historical context to understand are often marginalized. For example, a short video about traditional papermaking techniques might only show the visual spectacle of a certain step in its production process, while ignoring its underlying complex processes, ecological ethics, and the cultural value it carries. Virilio (1994), in *The Vision Machine*, criticizes the impact of speed on modern society, arguing that the acceleration of speed leads to a decline in people's perceptual abilities, making it difficult for people to think deeply and understand things. In the digital age, algorithmic logic further accelerates the flow and turnover of information, making users immersed in a rapid stream of information for a long time, unable to calm down to conduct in-depth understanding and reflection on ICH. This "accelerated" mode of cultural consumption deprives the memory of ICH of its sense of historical depth, turning it into a superficial and fragmented existence.

On digital platforms, users are both consumers of cultural content and producers of content. Through interactive behaviors such as liking, commenting, forwarding, and imitating, users seem to actively participate in the dissemination and reproduction of ICH, but this participation is often unpaid. The time and energy invested by users are ultimately converted into the platform's traffic and data, rather than benefiting ICH itself or its inheritors. As Arvidsson (2006) points out in *Brands: Meaning and Value in Media Culture*, an important feature of the digital age is the increasingly blurred boundary between brands and consumers. Consumers, by participating in the production and dissemination of brand content, become "co-creators" of the brand. However, this "co-creation" is often unequal, with brands and platforms holding greater discursive power and control, while users are reduced to passive participants. In the dissemination of ICH, this unequal relationship is particularly evident. Users seem to be actively participating in the dissemination of ICH, but in reality, they are inadvertently helping the platform complete its cultural exploitation of ICH. This model of "participation as exploitation" not only deprives users of their due compensation for their labor but also dissolves users' ability to critically reflect on cultural heritage. In the process of seemingly active participation, users gradually lose their ability to think and judge ICH independently, and their critical subjectivity disappears with it.

In conclusion, cross-platform narratives on digital platforms, while accelerating the dissemination of ICH cultural memory, also bring about undeniable negative effects. The commodification of memory under algorithmic logic not only fragments the cultural memory of ICH, but more importantly, it transforms users into unpaid "digital laborers." In the "participation as exploitation" model, it gradually dissolves users' critical subjectivity. This "dehistoricization" and "desubjectification" of ICH pose unprecedented challenges to its transmission. The crux of these problems lies in questioning the ethical boundaries and responsible subjects of technological intervention, and accordingly constructing a more responsible and sustainable mode of ICH dissemination. These reflections also provide an important foundation for our discussion of the "ghostly technology ethic" in the next section.

Ethical Negotiation: The Threshold of Technological Intervention and the Ghostly Contract

In the previous two sections, we analyzed how super-visual encoding and cross-platform narratives symbolize and commodify ICH. This section will delve into the ethical boundaries of technological intervention in ICH transmission. We argue that technology is not a neutral tool, and its intervention inevitably raises ethical issues. As Stiegler (1998) argues, technology is a "pharmakon," both a remedy and a poison. In the transmission of ICH, how to balance technological innovation and the preservation of cultural traditions, and how to avoid damaging its authenticity while enhancing the dissemination effect of ICH through technology, are urgent questions. These questions become even more prominent when using "ghostly" technologies such as AR/VR. We maintain that it is necessary to establish a "ghostly contract" between technological intervention and ICH preservation to ensure that technological innovation does not completely replace the authenticity and uniqueness of ICH, and to maximize the positive interaction between technology and culture.

The Ghostly Presence of Mediatized Preservation

Understanding the ethical issues of technological intervention in ICH requires us to re-examine the concept of "mediatized preservation." Derrida's (1994) "hauntology," presented in *Specters of Marx*, provides us with a unique perspective for understanding "mediatized preservation." According to Derrida, the specter is not pure nothingness but a special state of "both existing and non-existing," constantly hovering between "presence" and "absence." This "ghostliness" is precisely embodied in the technological representation of ICH. When AR/VR technologies are used to restore the production process of ICH or to reproduce the historical scenes of ICH, they do not create a true reproduction of the past but a "ghostly" representation. For example, through VR technology, audiences can "immerse" themselves in the production process of Xuan paper, but this is still essentially different from the real production process of Xuan paper. The former is a digital virtual experience, while the latter is a real material production process. Although this virtual experience can stimulate people's interest in ICH, it may also lead to misinterpretations and distortions of ICH. When experiencing the "ghostly" ICH, audiences may regard it as a "spectacle" or "exoticism" while ignoring the historical and cultural information it contains and the subjectivity of the inheritors.

Furthermore, Latour's (2005) "Actor-Network Theory" (ANT) also provides an important theoretical framework for us to understand the ethical issues of technological intervention in ICH. According to Latour, technology is not an isolated existence but is intertwined with people, objects, and society, forming a complex "actor-network." In this network, each actor has its own agency, and they interact and influence each other, jointly shaping the form and direction of the network's development. In the process of ICH mediatization, technology, inheritors, audiences, production teams, and policymakers are all actors in this network, and their respective interests and behaviors will affect the transmission of ICH. Therefore, we cannot simply regard technology as a neutral tool, but need to pay attention to the complex interaction between technology and people, technology and society, and the ethical issues contained in this interaction. For example, when developing an AR application about ICH, we need to consider not only the technical feasibility but also the willingness of the inheritors, the needs of the audience, the guidance of policies, and other factors, as well as the interaction between these factors. Only through full consultation and communication can a more just, reasonable, and sustainable ICH mediatization ecology be built.

In summary, the "ghostly" characteristics of mediatized preservation reveal the duality of technological intervention in ICH: technology can provide new possibilities for the dissemination of ICH, but it can also lead to misinterpretations and distortions of ICH. Therefore, we need to start from the perspective of the "actor-network" to build a framework for ethical negotiation between people and technology to ensure that technological innovation can be carried out under the premise of respecting the authenticity and uniqueness of ICH, and to achieve positive interaction between technology and culture. The establishment of this "ghostly contract" requires in-depth ethical reflection on the issue of the "threshold" of technological intervention, clarifying the boundaries and responsibilities of technological applications, so as to achieve a more responsible form of mediated transmission.

Boundary Games in Reflexive Practices

In the practice of technological intervention in ICH, the determination of boundaries is often a process of dynamic negotiation. This negotiation is not always smooth but is filled with various conflicts of interest and power struggles. The cases of *Reviving the Craftsmanship* show that disputes often arise between the production team and inheritors over technology application, content presentation, and intellectual property rights. These disputes highlight the challenge of balancing innovation with respect for tradition and the risk of compromising authenticity while enhancing dissemination. By analyzing these cases, we can see that the boundaries of technological intervention are not fixed but are constantly shaped and reshaped in reflexive practices.

Take, for example, the attempt to "restore the ancient method of Xuan paper production using AR" in *Reviving the Craftsmanship*. The program team tried to use AR technology to reproduce the process of making Xuan paper using ancient methods. However, in practice, a disagreement arose between the production team and the inheritors regarding the degree of openness of the "potion formula." The production team, from the perspective of the program's effect, hoped to disclose the "potion formula" to enhance the program's appeal, while the inheritors, considering the protection of trade secrets, opposed the disclosure. Eventually, both parties reached a compromise, that is, to technically blur the "potion formula." This case shows that technological intervention in ICH is not simply the application of technology but a process involving the negotiation of interests among multiple parties. In this process, technology itself has also become an object of negotiation, and the way it is applied and presented needs to be adjusted through continuous communication and negotiation. As Giddens (1991) points out in *Modernity and Self-Identity*, an important feature of modern society is "reflexivity," that is, people's actions are constantly influenced by feedback from various sources, and they adjust their actions based on this feedback. In the process of ICH

mediatization, this "reflexivity" is particularly evident. Producers, inheritors, audiences, and other subjects are constantly negotiating and adjusting the way and boundaries of technological intervention according to their own interests and demands.

Another noteworthy case is the controversy sparked by "AI pattern design." In recent years, with the development of artificial intelligence technology, some organizations have begun to try to apply AI technology to the design of ICH patterns. For example, an MCN organization launched the so-called "Virtual Huimo Artisan," using AI technology to generate Huimo patterns and selling related products on e-commerce platforms. This practice triggered strong resistance from real Huimo artisans. They believe that although AI-generated patterns may have a certain aesthetic appeal visually, they lack the cultural connotations and emotional expression contained in traditional patterns, and they cannot replace the warmth and spirituality endowed by handcrafting. In addition, the emergence of these "virtual artisans" also poses a threat to the living space of real artisans, squeezing their commercial opportunities. To address this challenge, some local ICH protection agencies have begun to formulate corresponding regulations to restrict the abuse of AI technology in the field of ICH. For example, the Anhui Provincial ICH Association urgently issued the "Regulations on the Use of Virtual Images," requiring that when using AI technology to generate ICH-related content, it must be clearly marked as "non-real person technique." This incident shows that the boundaries of technological intervention in ICH are not determined solely by the technology itself but require extensive negotiation and regulation at the social level. As Winner (2017) emphasizes in "Do Artifacts Have Politics?", technological artifacts are not neutral; they carry specific values and power relations. Feenberg (2002) also points out in *Transforming Technology* that we need to critically reflect on technology to prevent it from becoming a tool of oppression and control.

Through the analysis of the above cases, we can find that the boundaries of technological intervention in ICH are constantly being shaped and reshaped through reflexive practices. The production team, inheritors, audiences, policymakers, and the technology itself are all important participants in this process. Their interactions and negotiations jointly determine the specific form and boundaries of technological intervention in ICH. The determination of this boundary is not achieved overnight, but is a continuous and dynamic process, which requires us to constantly reflect and adjust in practice. Only through this continuous negotiation and game can we find a sustainable development path that can make full use of technological advantages and effectively protect the authenticity of ICH.

The Potential for a Ghostly Technology Ethic

Through the case analysis of technological intervention in ICH, we find that technology itself is not ethically neutral; its application inevitably raises complex ethical issues. How to balance innovation and tradition, how to protect the intellectual property rights of inheritors, and how to avoid damage to the authenticity of ICH through technology all require in-depth ethical reflection. We believe that it is necessary to construct a "ghostly contract of technological intervention," that is, while innovating technologically, we must always preserve the presence of tradition as a critical "other," rather than allowing technology to completely replace tradition. The construction of this "ghostly contract" not only requires ethical considerations but also institutional safeguards to provide a more responsible path for the mediatized transmission of ICH.

The "ghostly contract of technological intervention" means that when we use technology to restore and disseminate ICH, we should not regard technology as a panacea for all problems, but rather as a "ghost" that can both evoke our memories of the past and distort our understanding of the past. As Derrida (1994) elucidates in *Specters of Marx*, the "specter" reminds us that the past is not completely gone but exists in the present in a ghostly way and exerts an influence on the present. Therefore, we need to maintain a critical attitude and continuously reflect on the ethical impact of technological intervention. For example, in the case of AR restoration of ancient Xuan paper production, technology can restore certain aspects of the production process to a certain extent, but it can never fully replicate the bodily experience, cultural emotions, and subtle interactions in master-apprentice inheritance inherent in traditional techniques. The irreplaceability of this "other" is precisely what we need to protect in the process of technological intervention. As Stiegler (1998) argues, technology is a double-edged sword; it can bring us convenience, but it can also cause alienation. Therefore, we need to use technology prudently and avoid excessive intervention in ICH by technology.

To implement the "ghostly contract of technological intervention," we can draw on the idea of a "mediatized ethical assessment matrix" to conduct a more refined assessment of the impact of technological intervention on ICH. This matrix could include multiple dimensions, such as the impact of technological intervention on the degree of openness of ICH knowledge, the degree of simplification of ICH techniques, the impact on the economic interests of inheritors, and the impact on the cultural ecology of ICH. Through such a multi-dimensional assessment, we can better grasp the "threshold" of technological intervention and avoid irreversible damage to ICH. For example, when developing an ICH-related app, we need to assess whether the app will lead to excessive disclosure of ICH knowledge, whether it will simplify the complexity of ICH techniques, whether it will harm the economic interests of inheritors, and whether it will damage the original cultural ecology of ICH. Only on the basis of a full assessment can we make more responsible technological decisions. Nissenbaum's (2010) principle of "contextual integrity," presented in *Privacy in Context*, can also provide a reference for us to construct a "mediatized ethical assessment matrix." She argues that privacy issues are not absolute but are related to specific contexts. Similarly, the ethical issues of technological intervention in ICH also need to be considered in specific contexts. We need to formulate corresponding ethical norms according to different ICH items, different technological means, and different application scenarios.

In conclusion, constructing a "ghostly contract of technological intervention" requires us to seek a dynamic balance between technological innovation and cultural heritage preservation. On the one hand, we need to make full use of the advantages of technology to inject new vitality into the dissemination and development of ICH; on the other hand, we also need to be vigilant at all times to avoid damaging the authenticity of ICH through technology. To achieve this goal, we need to construct a

"mediatized ethical assessment matrix" to comprehensively assess all aspects of technological intervention and constantly adjust and improve our assessment system in practice. At the same time, it is also necessary to establish a sound intellectual property protection mechanism to ensure that the legitimate rights and interests of inheritors are fully protected. Only through such ethical negotiation, institutional safeguards, and positive interaction with technological innovation can we provide a more responsible and sustainable path for the mediatized transmission of ICH.

Conclusion

This paper, through an in-depth analysis of the case of *Reviving the Craftsmanship*, has revealed the complex role of mediatization in the transmission of ICH in China and proposed a new research paradigm of "mediatized shaping." This paradigm does not simply view media as a neutral tool but places it at the core of the formation of cultural memory, thus providing a new perspective for understanding the challenges and opportunities of contemporary ICH transmission. We argue that mediatization is not a simple means of "protection" or "development" but a creative reconstruction of cultural heritage in the dynamic interplay of technology, memory, and power; it is a new mode of cultural production.

The most significant theoretical contribution of this paper is the establishment of "mediatized shaping" as a new paradigm for ICH research, transcending the binary opposition of "protection/development" in traditional studies. This paradigm emphasizes that the transmission of ICH is not merely a replication of the past but a dynamic reconstruction in which media technologies play a crucial role. By introducing theories such as Derrida's "hauntology," Stiegler's "technics as pharmakon," and Latour's "actor-network theory," we have revealed the complexity and paradox of media technologies in shaping cultural memory, thus providing a more critical and reflective perspective for ICH research. Moreover, the concepts of the "ghostly technology ethic" and the "mediatized ethical assessment matrix" proposed in this paper also provide a critical operational framework for the creative transformation of ICH worldwide, helping us to use technological power more responsibly in future practice and promote the creative development of ICH.

Based on the above research, we believe that corresponding adjustments are needed at the policy and education levels. At the policy level, it is recommended to formulate an "Ethical Code for the Mediatization of ICH" to regulate and guide the mediatized practice of ICH and to mandate that ICH inheritors receive a share of the intellectual property revenue generated from the digital dissemination of ICH, with a recommended minimum of 30%. This measure aims to protect the economic rights of inheritors, encourage them to actively participate in the mediatized transmission of ICH, and promote the sustainable development of the ICH industry. At the education level, it is suggested to integrate media literacy and mediatized practice skills into local vocational education systems to cultivate a new generation of inheritors with dual "technology-culture" capabilities. This "dual capability" requires inheritors not only to master the traditional techniques of ICH but also to be able to skillfully use modern media technologies for innovative dissemination, thereby injecting new vitality into the future development of ICH.

Of course, this paper also has some unresolved questions. Firstly, with the rapid development of new technologies such as the metaverse and artificial intelligence, will the concept of "authenticity" of ICH fundamentally change? How should we rethink the "authenticity" of ICH in the context of deep integration of technology and culture? Secondly, this paper is mainly based on a case study in China. Then, how can we construct a more universal theory of mediatized transmission that also takes into account cultural diversity in the more complex context of globalization and localization? These questions require further research and discussion. Future research needs to pay more attention to the diversified development of ICH worldwide and the complex interaction of multiple factors such as technology, culture, economy, and politics, to provide more profound theoretical guidance and practical paths for the creative transformation of ICH globally.

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Analysis of the motivation and effect of Mindray Medical's share repurchase

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Abstract

Since the gradual relaxation of China's stock repurchase policy in 2018, many listed companies have implemented repurchases, among which the phenomenon of "flickering repurchases" has increased, causing the market to worry about insider trading and profit transmission. This paper takes Mindray as the research object to explore the motivation and effect of its share repurchase. The study found that the main motivations for Mindray to repurchase shares include equity incentives, cancellation of shares, reduction of registered capital, and reduction of agency costs. The buyback has a certain boost to the company's stock price in the short term, but its long-term support effect is limited. At the financial level, the buyback optimizes the company's financial indicators to varying degrees. This paper uses the event research method to analyze the short-term impact of the buyback announcement on the stock price, and evaluates the improvement of the buyback on the company's financial position based on the financial data. The results show that Mindray's buyback has diversified goals, but investors need to be alert to potential risks, and should comprehensively examine the buyback strength, process, and special action events to accurately judge the company's true motives.

Keywords : Share repurchase; Repurchase motivations; Marketing effect; Financial effect

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Introduction

Share repurchase originated in the United States in the 70s of the 20th century, and has been developed in the European and American capital markets for more than 50 years. In contrast, share repurchase started late in China, and then has only attracted the attention of domestic scholars and listed companies since 1990. The main reasons for choosing Mindray Medical in this article are as follows: At first, in recent years, China's listed companies have joined the wave of share repurchases, and as the domestic medical leader, Mindray Medical's two large-scale buybacks in half a year are noteworthy. Secondly, from the characteristics of Mindray Medical's share repurchase, not only is the repurchase scale large, the amount of the two repurchases is 1 billion yuan, and the repurchase efficiency is high, and the two repurchases were completed within one month, so the share repurchase cases of Mindray Medical are representative.

Literature review

Current status of domestic research

Reducing state-owned shares. Before the 2005 share split reform, state-owned shares dominated the market, and the main motivation for buybacks at that time was to reduce state-owned shares and non-current shares. At this time, Lan Faqin (2001) was represented by Lan Faqin (2001), who regarded share repurchase as an important tool for reducing state-owned shares in his discussion of the way to reduce state-owned shares. In addition, when Guo Yanchun (2001) talked about share repurchase and state-owned share reduction, he mentioned that the reduction of state-owned shares is a special task of share repurchase in China, and the purpose is mainly to reduce state-owned shares.

Stabilize the stock price. Feng Junxiu (2021) found that share buybacks reflect the confidence of managers in the future development of enterprises, which is conveyed to investors and promotes the return of stock prices to a reasonable range. Xu Sheng and Kan Yiwei (2022) believe that share buybacks promote stock price stability by boosting investor confidence and reducing analysts' forecast bias, and that stock price stability is more significant for buybacks for the purpose of boosting stock prices. In addition, Cui Yinggang (2022) found that the motivation for this round of buybacks is mainly to convey the signal that the company's stock price is undervalued and boost investor confidence by studying the "repurchase wave" of Hong Kong stocks in 2022.

Transfer of interests to shareholders. Chen Daisong and Sun Yanan (2020) believe that buybacks are usually accompanied by the possibility of shareholder reduction, benefit transfer, and risk transfer. Gao Liu (2021) believes that repurchase is a channel for insiders of listed companies to reduce their holdings in a targeted manner, and relevant entities can rely on information advantages to accurately reduce their holdings at a high level. In addition, Deng Quanying, Chen Ning, and Qin Shuai (2021) took the equity pledge of Wanfeng Aowei's controlling shareholder as a case study and found that the real

purpose of Wanfeng Aowei's share repurchase is to safeguard the interests of the controlling shareholder. Scholars represented by He Weifeng, Li Sihao, and Zhou Zilu (2021) found that increasing the liquidity of shares through buybacks is conducive to resolving the risk of control transfer of controlling shareholders. Yi Xiaohui (2022) found that holding treasury shares through buybacks will have a "crowding out effect" on small and medium-sized shareholders, reducing their influence, thereby leaving room for insider trading by executives and major shareholders.

Current status of research abroad

The financial leverage hypothesis. It was first born in the late 50s and early 60s of the 20th century, when it was accompanied by the discussion of capital structure in MM theory, which believed that enterprises could reduce owners' equity through share repurchase to increase financial leverage to achieve capital structure optimization. Scholars such as Hsuan-Chi Chen, Joel T. Harper, and Subramanian R. Iyer (2018) have found that share buybacks in low-leverage firms are mainly aimed at adjusting the capital structure.

The signaling hypothesis. The signaling hypothesis was first developed in the late 70s of the 20th century, when the U.S. economy was in a depression and investors generally lacked confidence. Among them, scholars such as Drousia Angeliki (2019) have concluded that buybacks of small firms and firms with high book-to-market value ratios are more in line with the signaling motivation.

Free cash flow hypothesis. The free cash flow hypothesis, coined in 1986, argues that excess free cash flow can cause managers to prioritize their personal interests over shareholder interests, such as using that cash for investments and inefficient acquisitions, thereby increasing agency costs. Therefore, share buybacks can be used to consume some cash to reduce agency costs. Later, scholars such as Gerald J. Lob and Ashok Robin (2020) supported share buybacks through empirical studies and proved that share buybacks and conservatism are potential mechanisms to counter management's overinvestment of free cash flow.

Equity incentive hypothesis. At that time, in the 90s of the 20th century, stock options began to rise, and this hypothesis was born, which believed that the purpose of corporate stock repurchase was to implement stock option plans, so as to motivate employees and tie the interests of employees and the interests of the company. Among them Cook Douglas Oand Zhang Weiwei (2022) found that the high sensitivity of CEO options to stock prices leads to more share buybacks.

Analysis and discussion

Company profile

The full name of Mindray Medical is Shenzhen Mindray Biomedical Electronics Co., Ltd., which was established in 1991. Mindray was listed on the New York Stock Exchange in 2006 but later underwent a privatization delisting in 2016. Subsequently, it returned to the A-share market and was successfully listed on the GEM of the Shenzhen Stock Exchange in 2018.

Since its establishment in 1991, Mindray has continued to invest in research and development. After more than 30 years of development, Mindray Medical has gradually developed into a leading medical device in China by virtue of its own product and R&D advantages. Mindray Medical is mainly engaged in the research, development, manufacturing, marketing and service of medical devices. The Company offers three main product categories, namely Life Information and Support, In Vitro Diagnostics and Medical Imaging. According to the 2021 annual report, life information and support products accounted for the highest proportion of operating income, reaching 44.14%, followed by in vitro diagnostic products and medical imaging products, accounting for 33.43% and 21.47% respectively.

Mindray Medical's share repurchase process

1. The first share repurchase process

First share buyback: August 26, 2021 – September 1, 2021. At that time, the stock price was volatile, and Mindray had abundant cash flow, so in order to enhance investor confidence, Mindray decided to complete the buyback within 12 months. On August 26, 2021, Mindray disclosed its first share repurchase plan, according to which the upper limit of the repurchase price is 400 yuan per share, the repurchase amount is 1 billion yuan, and the number of repurchases accounts for 0.2056% of the total share capital, all of which are used to implement equity incentives or employee stock ownership plans.

From the perspective of the repurchase process, the first share repurchase was completed on September 1, 2021, which took only one week. On August 31, 2021, Mindray Medical repurchased 1,649,938 shares for the first time through centralized auction transactions, accounting for 0.14% of the total share capital on the announcement date, with a repurchase amount of 537 million. The day after the repurchase, Mindray disclosed the "Announcement on the Progress of the First Repurchase of the Company's Shares and the Repurchase of Shares" according to the progress of the shares, which showed that as of September 1, 2021, it had repurchased a total of 3,048,662 shares, accounting for 0.25% of the company's total share capital, with a repurchase amount of 999,990,78617 yuan, which has reached the maximum executable amount of 1 billion. At this point, the first share repurchase of 1 billion yuan was officially completed.

2. The second share repurchase process

Second share buyback: January 13, 2022 – February 23, 2022. Mindray Medical released a buyback plan on January 13, 2022. The buyback, which is mainly based on Mindray's future growth prospects and operating performance, will subsequently

cancel the repurchased shares, and the company's registered capital will also be reduced, and the company seeks to increase investor confidence by demonstrating its commitment to long-term growth and increasing the value per share. According to the plan, the upper limit of the repurchase price is 400 yuan per share, the repurchase amount is 1 billion yuan, and the repurchase number accounts for 0.2056% of the total share capital.

From the perspective of the repurchase process, the second share repurchase was completed on February 23, 2022, and it took about one month. Mindray's first repurchase was on February 11, 2022, when it repurchased 950,328 shares, accounting for 0.08% of the total share capital on the announcement date, with a repurchase amount of RMB 285 million. Subsequently, as of February 23, 2022, a total of 3,249,872 shares of the company have been repurchased, accounting for 0.25% of the company's total share capital, and the repurchase amount is 999,944,451.22 yuan, which has reached the maximum executable amount of 1 billion. So far, the second share repurchase of 1 billion yuan has been implemented.

Analysis of Mindray's Share Repurchase Motivation

1. Employee equity incentives

As a long-term mechanism, employee equity incentive is not only conducive to mobilizing the enthusiasm of employees, establishing a mechanism for connecting the interests of employees and the company, but also reducing the company's talent loss and escorting the company's long-term development. Mindray uses the repurchased shares for the employee stock ownership plan, which ensures that the value per share of shareholders is not diluted, which is more shareholder-friendly and takes into account the interests of the company, shareholders and employees.

On August 26, 2021, Mindray Medical made it clear in its first share repurchase announcement that the repurchased shares will be used for equity incentives or employee stock ownership plans. If the company has unused repurchased shares within 36 months after the completion of the repurchase, these shares will be cancelled. Subsequently, on January 20, 2022, Mindray Medical released the 2022 Employee Stock Ownership Plan (Draft), which stipulates that the repurchased shares will be used entirely for Mindray's 2022 employee stock ownership plan. The draft makes it clear that this move is to mobilize the enthusiasm of employees and promote the long-term and healthy development of the company. Therefore, judging from the timeliness of the disclosure of the employee stock ownership plan, Mindray's first share repurchase was indeed used for equity incentives.

Further analysis of the reasons behind equity incentives shows that Mindray Medical is in an industry that requires continuous innovation, and Mindray Medical has been attaching importance to R&D investment for many years, investing about 10% of its revenue in R&D every year. Mindray realizes that in order to achieve long-term development, it must invest more time and resources in talents, and equity incentives are one of the important ways. This is not only conducive to aligning the interests of the company and employees, improving the enthusiasm and cohesion of employees, but also reducing the loss of talents such as core employees and technical backbones.

2. Cancellation and reduction of registered capital

On January 13, 2022, Mindray Medical stated in the second share repurchase announcement that the repurchased shares will be cancelled in accordance with the law and the registered capital will be reduced. As of February 23, 2022, the company completed the second share repurchase, and issued the "Announcement on the Implementation Results of Share Repurchase and Share Changes" on the next day according to the completion of the repurchase. With the release of Mindray's 2021 annual report, the company's operating income and performance growth have slowed down, and the market believes that Mindray's performance is less than expected, which affects investor confidence and further causes the stock price to fall. Therefore, in this context, the cancellation can directly reduce the company's share capital and increase earnings per share, and ultimately safeguard the interests of investors.

3. Reduce agency costs

In order to verify whether the company's repurchase is for the purpose of managing idle funds and reducing agency costs, this article will analyze the net cash flow of monetary funds and investment activities in combination with the two repurchases of 1 billion yuan.

First of all, from the perspective of monetary funds, Mindray Medical's monetary funds before the two share repurchases exceeded 15 billion yuan, which indicates that the company's monetary funds are sufficient, even if the repurchase amount is as high as 1 billion yuan, it only accounts for 6.40% of the monetary funds in Q2 2021, accounting for a small proportion, and the share repurchase will not bring great financial pressure to Mindray Medical. At the same time, it can consume part of the cash to promote the management to make prudent decisions, thereby alleviating agency costs. Therefore, Mindray's buyback is likely to be due to the consideration of reducing agency costs.

Secondly, from the perspective of cash flow from investment activities, the net cash flow from Mindray Medical's investment activities before the two buybacks was less than 0. In the quarter before the first repurchase (Q2 2021), the net investment flow was -371 million yuan, and in the second repurchase quarter (Q4 2021), its net investment flow was -336 million yuan. It can be seen that the input of Mindray's investment activities before the two buybacks is greater than the output, indicating that the company's investment efficiency is not optimistic, and it cannot be ruled out that the management abused its power to use idle funds for inefficient investment. Therefore, the consumption of part of the funds through share repurchase is conducive to curbing the inefficient investment behavior of Mindray Medical's management, thereby further reducing agency costs.

In short, Mindray had abundant cash flow and idle funds before the buyback. Based on this, for this part of the idle funds, the company will use them for share repurchase, which is not only conducive to improving the efficiency of capital use, but also reducing agency costs.

Analysis of the Effect of Mindray Medical's Share Repurchase

1. Market Effects

(1) The first share repurchase

The basic method of event research refers to understanding the impact of a specific economic event on the stock price of listed companies through regression analysis, and its basic method is to first calculate the event date, window period and estimated period, and then calculate the AR and CAR of the window period based on the regression equation of the estimated period, so as to judge the impact of the event on the company's stock price.

In the analysis of the case of Mindray, this paper first selects the date of Mindray's buyback announcement as the event date and denotes it as $t=0$, then takes the 10 days before and after the event as the window period and denotes it as $t=(-10, 10)$, and then takes the 120 days before the window period as the estimation period and denotes it as $t=(-130, -10)$. Then, linear regression was performed on the estimation period data, and the linear regression equation of Mindray was obtained, and finally the AR and CAR in the window period were calculated.

Since Mindray is listed on the Shenzhen Stock Exchange, the Shenzhen Component Index is used as the market yield, and Excel is used to perform linear regression on the estimated period data, and finally the linear regression equation of Mindray Medical is obtained as follows: $R_{it} = 1.3510R_{mt} - 0.1029$, where R_{it} represents the expected rate of return and R_{mt} represents the market rate of return.

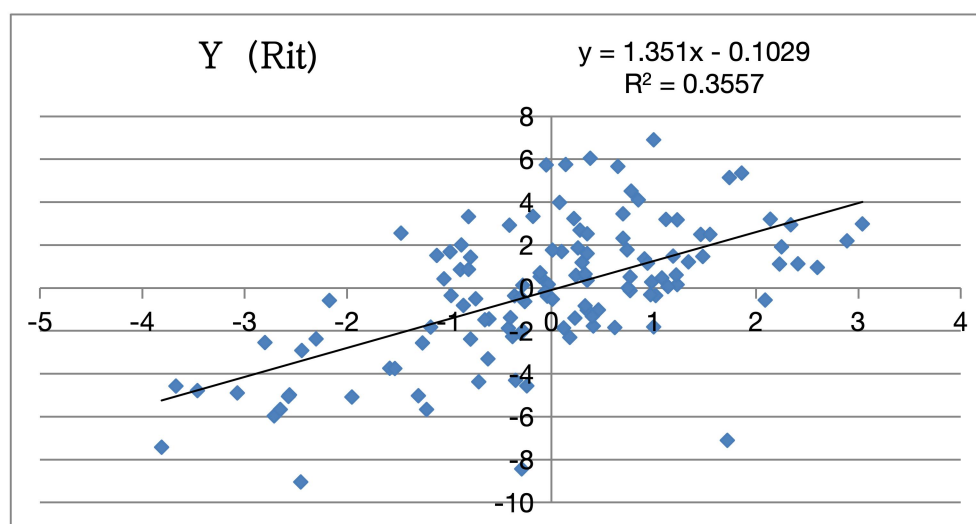


Figure 1 Mindray's first share repurchase regressed linearly
Data source: Excel processing according to the tide information

From Table 1, it can be seen that Multiple R = 0.596426, and its value is generally between -1 and 1, and the closer Multiple R is to 1, the stronger the correlation, which is greater than 0.5, indicating that the correlation is strong in this repurchase analysis. The Significance F-value is 6.58×10^{-13} (less than 0.0001), and the smaller the value, the better, which shows that the regression results have a high degree of confidence and reach more than 99.99%, so the repurchase results are trustworthy. In addition, from the P-value, it can be found that the t-test of variable X is also significant, with a value of 6.58×10^{-13} , which is much less than 0.01, that is, there is a significant relationship between market return and expected return.

Table 1 Linear regression analysis of Mindray's first share repurchase

Regression parameters	numeric value
Multiple R	0.596426
Significance F	6.583512E-13
R Square	0.355724
Adjusted R Square	0.350264
standard error	2.552299
Observations	120
P-value	6.583512E-13

Data source: Excel processing according to the tide information

After obtaining $R_{it}=1.3510R_{mt}-0.1029$, Mindray Medical's excess rate of return AR_t and cumulative excess rate of return were calculated based on $AR_t=R_t-R_{it}$, the calculation results are shown in the following table:

Table 2 Calculation results of AR and CAR for Mindray's first share repurchase

t	Real rate of return R_t (%)	Expected rate of return R_{it} (%)	Excess rate of return AR_t (%)	Cumulative excess rate of return CAR_t (%)
-10	-2.54	-1.17	-1.37	-1.37
-9	-2.75	-1.04	-1.71	-3.08
-8	0.70	-1.06	1.76	-1.32
-7	-6.22	-3.25	-2.97	-4.29
-6	0.76	0.87	-0.11	-4.40
-5	-3.44	0.21	-3.65	-8.05
-4	-17.05	-2.28	-14.77	-22.82
-3	8.13	2.57	5.56	-17.26
-2	1.61	1.09	0.52	-16.74
-1	4.34	0.21	4.13	-12.61
0	0.83	-2.70	3.53	-9.08
1	0.56	0.10	0.46	-8.62
2	-1.31	-0.22	-1.09	-9.71
3	2.82	-0.99	3.81	-5.89
4	0.91	-0.24	1.15	-4.74
5	-1.92	-0.45	-1.47	-6.21
6	2.01	-1.02	3.03	-3.18
7	7.68	3.40	4.28	1.11
8	-2.99	1.34	-4.33	-3.23
9	-3.75	-0.24	-3.51	-6.74
10	0.35	-0.01	0.36	-6.38

Data source: Excel processing according to the tide information

As shown in Figure 2, comparing the excess rate of return and cumulative excess rate of return before and after Mindray's first share repurchase, it can be found that before the first repurchase (August 26, 2021), the AR as a whole showed a downward trend and remained below 0 for a long time and reached its lowest point at t(-4), with an AR value of -14.77%. Then t(-3) rebounded to 5.56%, followed by t(-2, -1) AR fell first and then rose. Among them, the increase in t(-1) was mainly due to Mindray's announcement on August 25, 2021 that the company intends to repurchase 2.5 million shares, which stimulated market confidence and pushed the stock price up.

In addition, from the perspective of CAR, CAR generally fell first and then rose during the window period, but due to the fact that AR fell more and rose less, the CAR during the window period was negative for a long time, until t(7) successfully turned positive, and the CAR reached 1.11%, and then fell to negative again. It can be seen that Mindray's first repurchase has a short-term effect on stopping the decline, but the effect is very limited.

In general, before and after the first buyback, Mindray Medical mainly generated significant excess returns in the three days before and after the event, which indicates that the market may have reacted to Mindray's share repurchase announcement in advance, which stimulated the rise of the stock price, but the share repurchase had a limited role in supporting the stock price.

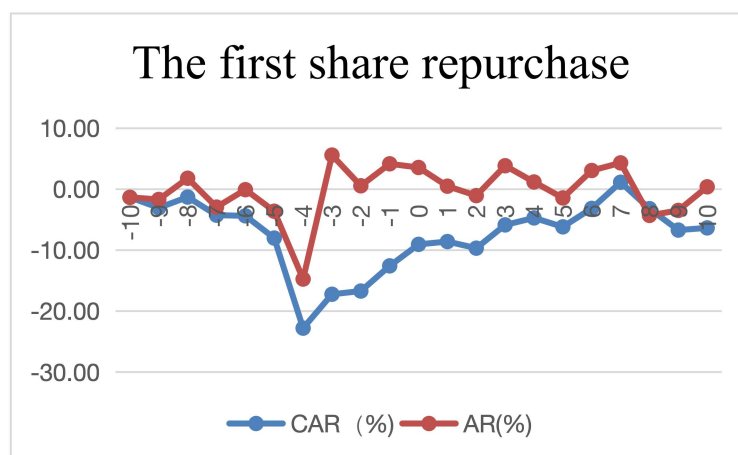


Figure 2 Trend chart of Mindray's first share repurchase of AR and CAR
Data source: Excel processing according to the tide information

(2) The second share repurchase

In this paper, the data of the second share repurchase is regressed according to the same method, and the regression equation of Mindray Medical for this repurchase is as follows: $R_{it}=1.3473R_{mt}-0.1061$.

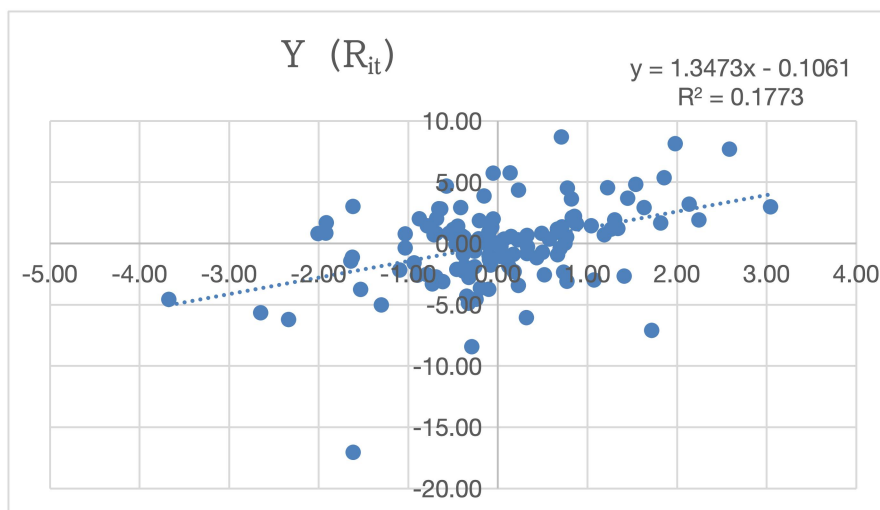


Figure 3 Linear regression of Mindray's second share repurchase
Data source: Excel processing according to the tide information

From the regression results of Mindray's second share repurchase, it can be seen that Multiple R=0.421123, which is less than 0.5, indicating that the correlation between the two variables of expected return and market return during this period is weak, and the Significance F value is 1.67×10^{-6} , which is less than 0.0001 at this time, which shows that the confidence level is still more than 99.99%, indicating that the regression results have a high degree of confidence. In addition, the P-value value is 1.67×10^{-6} , which is less than 0.01, which means that the t-test of the X variable is significant, that is, the market return has a significant impact on the expected return.

After obtaining the linear regression equation $R_{it}=1.3473R_{mt}-0.1061$, Mindray calculated AR_t and CAR_t according to the $AR_t=R_t-R_{it}$ formula, and the calculation results are shown in Table 4.

Table 4 Calculation results of AR and CAR for Mindray's second share repurchase

t	Real rate of return R_t (%)	Expected rate of return R_{it} (%)	Excess rate of return AR_t (%)	Cumulative excess rate of return CAR_t (%)
-10	-0.75	-1.78	1.02	1.02
-9	1.82	1.20	0.62	1.64
-8	-0.57	0.45	-1.02	0.62
-7	-10.22	-0.70	-9.52	-8.90
-6	0.97	-2.52	3.50	-5.40
-5	-2.09	-1.00	-1.09	-6.49
-4	-2.96	-0.91	-2.05	-8.54
-3	-0.47	0.49	-0.96	-9.50
-2	-2.28	-1.82	-0.46	-9.96
-1	3.42	1.77	1.66	-8.30
0	-1.95	-2.75	0.80	-7.50
1	4.42	0.01	4.41	-3.09
2	-0.27	1.92	-2.19	-5.28
3	1.18	0.15	1.02	-4.26
4	-1.66	-1.83	0.17	-4.08
5	5.88	-0.19	6.07	1.99
6	-3.58	-1.71	-1.88	0.11
7	-1.39	0.40	-1.78	-1.67
8	1.04	-3.91	4.96	3.29
9	-2.16	0.84	-3.00	0.29
10	-2.28	-3.84	1.55	1.84

Data source: Excel processing according to the tide information

For the second buyback released on January 13, 2022, AR had already rebounded before the buyback event date, suggesting that the market may have reacted early to the buyback of Mindray Medical's shares. The AR after the buyback announcement date fluctuated around 0 but was generally positive, indicating that the market has reacted positively to the share buyback of Mindray Medical. From the perspective of CAR, its value has been below 0 for a long time, and it does not turn positive until t(5), indicating that even if there is a short-term stop effect, the effect is very limited.

In general, after the second share repurchase, Mindray Medical generated excess returns, and the cumulative excess return turned positive, which indicates that the market has reacted positively to the second share repurchase announcement to a certain extent.

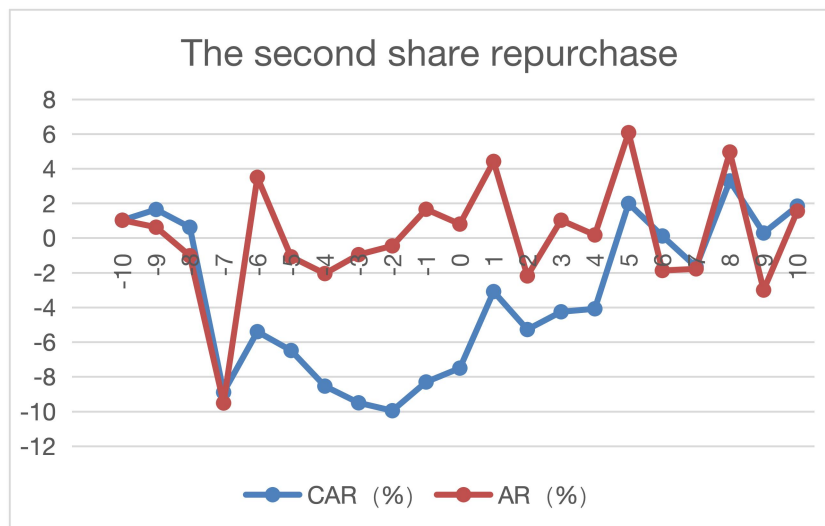


Figure 4 Trend chart of AR and CAR of Mindray's second share repurchase
Data source: Excel processing according to the tide information

2. Market Effects

(1) The first share repurchase

As shown in Figure 5-9, Mindray's current ratio, quick ratio, and cash ratio all fluctuated and decreased in the quarter following the first share repurchase. Among them, the current ratio was 2.77 in the quarter before the buyback, and it dropped to 2.41 during the buyback period, which was a significant decline, but the current ratio rose to 2.47 in the quarter after the buyback, and the overall change was not much. At the same time, the quick ratio is also declining, from 2.34 before the first repo to 1.99 during the first repo, a decrease of 14.96%, and then the quick ratio has rebounded. In addition, the cash ratio also experienced a downward trend and then an upward trend, from 2.00 as at 30 June 2021 to 1.63 as at 30 September 2021, before edging up to 1.78 on 31 December 2021. The decline was mainly due to the fact that Mindray Medical used 1 billion yuan to repurchase shares, which led to a decrease in the company's cash holdings, which affected Mindray's short-term solvency.

In short, Mindray's current ratio, quick ratio, and cash ratio have all decreased after the first repurchase, while the asset-liability ratio has generally increased and is close to the industry average. It can be seen that the first share repurchase has weakened Mindray's short-term and long-term solvency to a certain extent. However, due to Mindray's sufficient liquidity and zero interest-bearing liabilities, the buyback will weaken the company's solvency less.

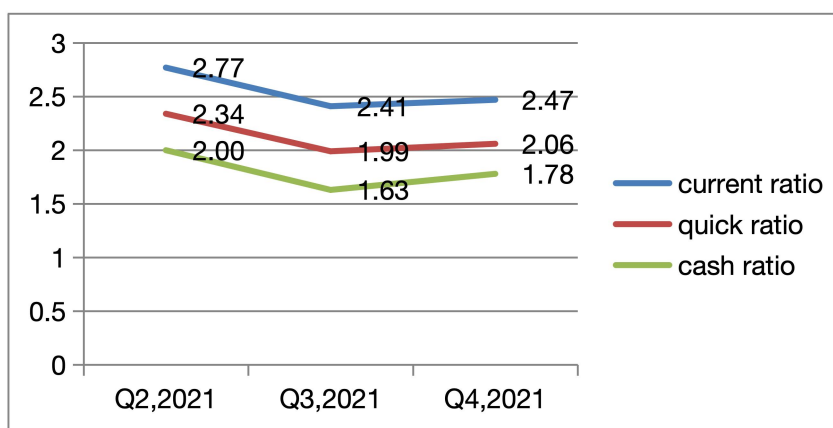


Figure 5 Short-term solvency indicators before and after Mindray's first repurchase
Data source: Juchao Information Network

(2) The second share repurchase

From the perspective of short-term solvency indicators, Mindray's current ratio, quick ratio and cash ratio were all declining before and after the second share repurchase. Specifically, Mindray's current ratio decreased from 2.47 in Q4 2021 to 2.03 in Q2 2022, and at the same time, the quick ratio continued to decline before and after the second share buyback, from 2.06 in the quarter before the buyback to 1.63 in the quarter after the buyback, a decrease of 20.87%. In addition, the cash ratio also showed a downward trend, from 1.78 before the buyback (Q4 2021) to 1.24 after the buyback (Q2 2021). The decline was mainly due to the reduction of corporate capital and liquid assets by the second repurchase, which led to a decline in short-term solvency.

Overall, Mindray's current ratio, quick ratio, and cash ratio all decreased after the second repurchase, and the decline was greater than that of the first repurchase, indicating that Mindray's second share repurchase weakened its short-term solvency even more.

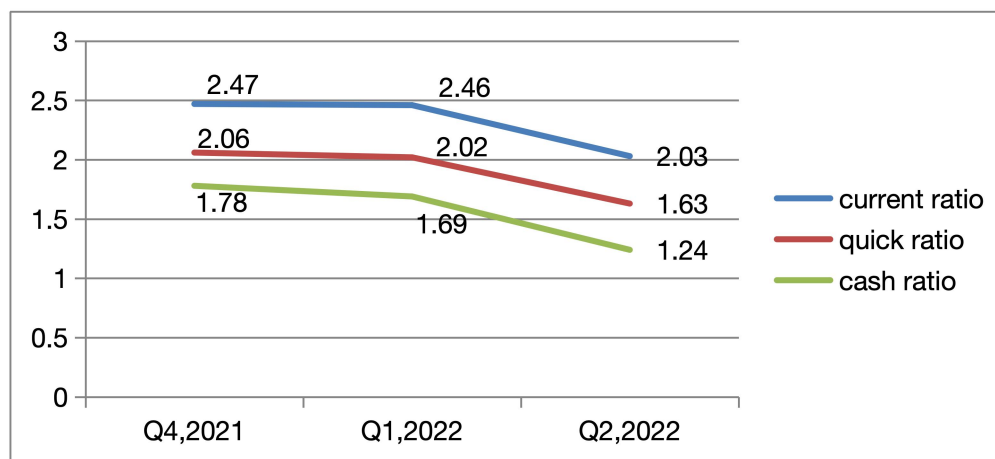


Figure 6 Mindray's short-term solvency indicators before and after the second repurchase
Data source: Juchao Information Network

In short, Mindray's current ratio, quick ratio, and cash ratio have all decreased after the second repurchase, while the asset-liability ratio has increased overall. It can be seen that the second share repurchase has weakened Mindray's short-term solvency to a certain extent, and has little impact on its long-term solvency.

Conclusion

The motives for share repurchase are diversified.

In terms of repurchase motivation, combined with the research on Mindray's repurchase motivation in Chapter 4, it is not difficult to find that Mindray's share repurchase motivation is diversified. First of all, one of the main motivations is to use share repurchase for equity incentives, avoid the loss of core employees and technical backbones, and improve the cohesion of employees and the competitiveness of the company. Secondly, from the perspective of free cash flow, reducing idle funds and reducing agency costs is a major motivation. Finally, combined with Mindray's buyback strength and repurchase process, it can be seen that Mindray's two buybacks were supported by abundant cash flow and were successfully completed in a short period of time, indicating that Mindray's buyback execution is relatively high. In short, Mindray's share repurchase motives are diversified, not only to stimulate market confidence, employee stock ownership incentives, but also opportunistic motives, so it is necessary to identify the real motives of share repurchase from multiple perspectives.

Share repurchase has a short-term supporting effect on the stock price.

As mentioned in Chapter 3 of Mindray Medical's share repurchase characteristics, Mindray's two share buybacks were launched during the downward phase of the stock price. Mindray's share price experienced a long period of decline before the share buyback, and since the implementation of the buyback, Mindray's share price has begun to rebound locally, indicating that the share buyback has a certain stimulating effect on Mindray's share price. Subsequently, after the analysis of market effects, it can be seen that in the two buybacks, Mindray Medical's AR and CAR both had a clear upward trend during the window period, but soon began to fluctuate and fall again. It can be seen that the share repurchase has a certain stimulating effect on Mindray's stock price in the short term, but the effect is limited.

Share buybacks have improved the company's financial performance

According to the "Analysis of the Financial Effect of Mindray Medical", the share repurchase has weakened Mindray's solvency on the one hand, and promoted the company's operating ability and profitability on the other hand, and optimized its capital structure. Overall, the impact of Mindray's share buyback on the company is basically positive.

First of all, after Mindray implemented the share repurchase, the current ratio, quick ratio, and cash ratio all decreased, which shows that the share repurchase has weakened Mindray's short-term solvency. Secondly, after the share repurchase, Mindray's accounts receivable turnover, inventory turnover, and total asset turnover have all increased to varying degrees, indicating that Mindray's operating capacity has been improved. In addition, the increase in return on equity and net profit margin on sales represents an increase in profitability. Overall, Mindray share buybacks have improved the company's financial performance.

On the other hand, the company should promote the construction of a long-term mechanism for share repurchases. At present, most of the share repurchases carried out by Chinese companies are based on stabilizing the stock price, and when the company's stock price is in a downturn, the share repurchase is used as a "first aid medicine" to quickly stabilize the stock price. Compared with stabilizing the stock price, share repurchase has more far-reaching significance for the company to improve the equity structure, reduce agency costs, and replace cash dividends. In the case of Mindray Medical, the company reduced agency costs and increased employee motivation through share repurchase, which is conducive to promoting the company's long-term development. Therefore, the company can tap the long-term mechanism of share repurchase according to its own actual situation, so as to promote the share repurchase to play a longer-term role.

Revelation

Listed companies: Optimize repurchase strategies by category.

Share repurchase is a common corporate governance tool in the capital market, and listed companies should formulate a reasonable repurchase strategy based on their own needs and market environment. Different types of enterprises need to pay attention to different core issues when buying back.

(1) Large enterprises: pay attention to long-term mechanisms to improve the efficiency of capital operation.

For enterprises with abundant funds and greater market influence, share buybacks should go beyond short-term stock price management and pay more attention to capital structure optimization and long-term incentive mechanisms. For example, Mindray reduces agency costs through share buybacks and improves the incentive effect of management and employees, thereby promoting the sustainable development of the company. Therefore, large enterprises can incorporate buybacks into their long-term capital operation strategies to optimize their equity structure, enhance shareholder returns, and form a comprehensive capital management system in combination with equity incentives and cash dividends.

(2) Small and medium-sized enterprises: rational repurchase to avoid the pressure of capital chain.

For small and medium-sized businesses, cash flow management is even more critical. If the company is financially sound and undervalued, a modest buyback can convey market confidence and enhance shareholder value. However, if the buyback consumes too much cash, it may lead to liquidity constraints and affect the normal operation of the enterprise. Therefore, when formulating a buyback plan, SMEs should fully assess their financial situation to ensure that the buyback will not affect the development of their main business, and at the same time avoid missing out on high-quality investment opportunities due to short-term stock price management.

Investors: identify the motivation for repurchase in multiple dimensions.

As the motives for share buybacks become increasingly diversified, investors, especially small and medium-sized shareholders, need to rationally analyze the true intentions of buybacks and avoid blind investment.

(1) Pay attention to the company's financial situation and judge the feasibility of repurchase

Investors can assess the sustainability of buybacks based on a company's cash flow position, debt level and profitability. In general, companies with abundant cash flow and stable earnings are more likely to buyback, while large buybacks by cash-strapped companies with high debt ratios may be risky. For example, if a company announces a large-scale buyback amid declining earnings and tight cash flow, investors need to be wary of whether it has an incentive to maintain its share price or hide its financial problems.

(2) Evaluate the company's integrity based on the implementation of the buyback

Investors should pay attention to the implementation of the company's repurchase plan, including whether the repurchase amount has shrunk and whether it has been completed as planned. If the company's buybacks are frequently postponed or the amount is much lower than the announced plan, it may mean that the management lacks integrity and even has the potential to manipulate the market.

(3) Pay attention to special events and be alert to potential risks

Share buybacks are often accompanied by other capital market behaviors, such as the increase or decrease of major shareholders' holdings, the pledge of a high proportion of shares, or the lifting of the ban on large-scale restricted shares. If the buyback occurs before the major shareholder reduces its holdings, investors need to be wary of whether the buyback is used to increase the stock price and facilitate the withdrawal of the major shareholder. In addition, if the company's equity pledge ratio is too high, the buyback may be to stabilize the stock price and avoid the pledge liquidation, rather than to protect the interests of small and medium-sized shareholders.

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Healing Through Nature: A Case Study Analysis of Ericksonian Hypnosis and Reiki-Infused Transpersonal Counseling for Eco-Anxiety Relief

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Abstract

Eco-anxiety, an intensifying social threat related to climate change that significantly impacts individuals' mental wellbeing and societal steadiness, especially in densely urbanized communities such as Hong Kong, where environmental forces are compounded by limited access to nature. This case study examines the effectiveness of incorporating Ericksonian hypnosis and Reiki therapy into a transpersonal counselling setting to alleviate eco-anxiety in three Hong Kong residents. Participants comprised a 22-year-old female university student experiencing relationship distress and climate anxiety, a 45-year-old married male suffering from work-related stress and concern for his children's environmental futures, and a 52-year-old female homemaker struggling with chronic fatigue syndrome for which her eco-anxiety was exacerbated by restrictions on mobility. Over 8 weeks in the program session, each participant was awarded weekly 60-minute sessions featuring hypnotic nature imagery (e.g., Hong Kong forests in Tai Mo Shan, Sai Kung beaches, Pok Fu Lam Reservoir) Reiki energy balancing targeting emotional and physical restoration and mindfulness exercises specific to their urban lifestyles. Pre-intervention and post-intervention EDS scores and qualitative self-reports suggest a steady 20-point decrease in anxiety (case A: 65 to 45), along with better emotional resiliency, renewed sense of connection to nature. This research shows that this multi-faceted approach has potential to not only improve individual eco-anxiety but also promote sustainable behaviours. Offering a practical model for addressing climate-related psychological burdens in urban settings. Further correlated studies on a larger scale are encouraged for further validation and to build on these preliminary results.

Keywords : Eco-Anxiety, Ericksonian Hypnosis, Reiki Therapy, Transpersonal Counseling, Nature Connection, Social Resilience

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Introduction

Eco-anxiety, a newly emerged psychological disorder characterized by chronic worry and helplessness regarding the ecological crises because of climate change, has been widely discussed as a pressing social problem in the 21st century, as its evolution presupposes starting from the growing concern about the destruction of our environment. While it affects people all over the world, with particularly acute manifestations in urbanized regions where natural disconnection contributes to making people feel even more distressed. In the densely populated city of Hong Kong, situated in one of the hottest areas in the world with higher temperatures, polluted air, and frequent typhoons, throughout the year, this is another way under which eco-anxiety has been able to become rampant in the city (Chan et al., 2013, p. 579). Its development is rooted in the issues associated with lack of green space and high urban density that contribute to intensify feelings of environmental confinement across each area of the city, resulting in increasing mental health problems related to emotional distress, fatigue, and existential dread (Pihkala, 2020, p. 7). Not only does this kind of psychological burden damage individuals' wellbeing but it reduces the resilience of society, preventing collective actions to reduce climate change. Not only is the city itself rapidly becoming more urbanized, but climate news has also brought to the attention of many an ever-present reminder of our growing problems with inaction. This is a direct recipe for anxiety and helplessness, acting as a vicious cycle of seemingly unending stress and irresponsibility that has the potential to seriously harm your health or community's well-being.

The proposed research seeks to examine the effectiveness of a transpersonal counseling-based integrative therapeutic approach of using Ericksonian hypnosis, Reiki therapy, and mindfulness practices within an integrative approach of transpersonal psychology to relieve eco-anxiety and foster social resilience among Hong Kong residents. Ericksonian hypnosis utilizes the unconscious mind as a tool to interpret perceptions differently (Erickson & Rossi, 1979, p. 34), Reiki therapy strategically removes energy imbalance to decrease stress (Miles & True, 2003, p. 62), and mindfulness emphasizes nature interaction in restoring mental clarity (Kaplan, 1995, p. 172). Based on this, this study aims to find out if the combination of them can decrease eco-anxiety. This integrative approach is particularly helpful towards people experiencing distress due to climate change because it is based on a transpersonal psychology that focuses on expanded consciousness and interconnectedness (Grof, 2000, p. 18). Three case studies are discussed to illustrate how these modalities can reduce the

occurrence of eco-anxiety among participants. Therefore, the results would boost their agency and motivations intramurally to indulge in environmentally friendly activities, thereby contributing to a more resilient urban society.

The relevance of this study comes from its contribution to a critical area of cross-disciplinary therapeutic research: psychological interventions for anxiety are already well documented, yet there have been only few attempts to combine transpersonal techniques with nature-based practices to address eco-anxiety specifically as it applies to cities. This research focuses on the unique socio-environmental context of Hong Kong in order to formulate a vehicle for mentally healthy outcomes and community-level interventions, which can be adopted around the world. This research addresses a pressing concern in the contemporary society: inadequate innovation in a city where several environmental stressors (e.g. long working hours, overall) add onto the common stresses associated with living in urban areas (e.g. overcrowding, smog, etc.), and where traditional treatment methods fall short to improve long-term conditions due to their nature. The discussion can be useful for clinicians or policymakers to develop effective interventions to intervene at both an individual and community level, even at the stage of initiating support (to build the bridge between the individual healing and the societal sustainability), and could then influence urban planners and institutions/researchers to emphasize more on the importance of protecting green spaces and feeling those safe havens for mental health support.

Literature Review

The escalating phenomenon of eco-anxiety – a symptom characterised by constant worrying and helplessness in response to ecological crises brought about by climate change – the issue has risen to the surface as a major social concern and has profound implications for both our mental health and, therefore, the mental health of our society. In this section, we outline the existing literature in order to establish the theoretical and empirical underpinnings upon which an integrative therapeutic approach to addressing eco-anxiety is possible, bearing particularly in mind its roots in its social milieu, the mechanisms by which it is able to heal itself from a psychodynamic perspective (Ericksonian hypnosis and Reiki), and its underlying theoretical underpinnings (transpersonal psychology and nature connection).

Eco-Anxiety's Social Roots

Eco-anxiety, the chronic fear of environmental collapse, has emerged as a prominent issue in the modern world, particularly with the increasing intensity of both urbanisation and climate change, which cause global ecological pressures (Pihkala, 2020, p. 7). As a result, this condition can be considered even more acute in densely populated urban centres, such as Hong Kong, where the increased urban density and limited availability of green spaces add to the general environmental stress. According to Chan et al. (2013, p. 579), the rising temperature, air pollution and frequent typhoons more generally create a challenging socio-environmental landscape in Hong Kong that further fuel the feelings of confinement and helplessness among residents, contributing to their psychological distress via emotional instability, fatigue and overwhelming existential dread that leads them to feel discouraged to act proactively towards the environment. As such, Pihkala (2020) argues that with its endless cityscapes and smog-filled skies, eco-anxiety represents a reflection of an evolving societal disconnection from the natural world, which, as previously mentioned, has been exacerbated through modern lifestyles such as long working hours and exposure to constant news coverage of climate disasters, increasing awareness of ecological threats without providing any form of coping mechanism.

The social roots of eco-anxiety go beyond the realm of individual psychology and affect community dynamics. In Hong Kong, the absence of an accessible natural environment contributes to an ongoing cycle of anxiety and inaction that compromises collective resilience. For example, students who are exposed to alarming climate data in academic settings; professional staff, such as teachers and doctors, struggling with work-related stress amid polluted air; and homemakers chained to their health concerns or urban living conditions are at one of the highest risks. These groups constitute an exceptional vulnerable population due to their dependence on others to ensure their needs (Chan et al., 2013). Cultural aspects contribute to the prevalence of eco-anxiety which includes the tendency of individuals to prioritize economic productivity over environmental well-being. Overall, individuals feel alienated from nature and continue to distance themselves from it. According to Pihkala (2020), this relationship between humans and nature contributes to the aggravation of mental health challenges and inhibits society's attempt to promote sustainable lifestyles. Therefore, there is an urgent need for adequate interventions to restore the human-nature connection. As a result, addressing eco-anxiety calls for an interdisciplinary approach that considers the urban socio-environmental context, as well as its psychological ramifications, facilitating the guiding principles that are incorporated within therapeutic approaches explored in this study.

Ericksonian Hypnosis and Reiki's Healing Mechanisms

The therapeutic potential of Ericksonian hypnosis and Reiki therapy provides promising avenues for reducing eco-anxiety, utilizing both unique but complementary mechanisms. Ericksonian hypnosis is a technique designed by Milton H. Erickson for harnessing indirect suggestions and the unconscious mind to reframe perceptions and manage emotions (Erickson & Rossi, 1979, p. 34). It utilizes vivid imagery (including natural landscapes) that allow for the subconscious escape also conserved from conscious resistance, enabling people to break the emotional cycle of complex emotions (including helplessness and fear accompanying ecological crisis). Yapko (2012, p. 102) stressed that this method allows one to remain more emotionally flexible, transitioning from neurotypical rumination brought on by anxiety to a more adaptive state of mind — which may be considered an essential need for those enshrouded in climate change narratives. Its tenant's adaptability makes it effectively suited for kaleidoscopic urban environments where personalized coping measures are most urgently needed.

Reiki therapy is a biofield energy practice that can complement hypnosis in providing a response to somatic manifestations of eco-anxiety. Miles and True (2003, p. 62) explain how Reiki restores and balances energy circulation, specifically using targeted chakras and allows people to release any stressful feelings, in order to make them relaxed. For example, targeting the heart and solar plexus chakra can enable an individual to physically release emotional suppression, whereas targeting their root chakra helps them establish grounding from which they can escape from the instability that concerns them due to their concerns about the environment. Wardell and Engebretson (2008, p. 45) used empirical evidence from the study that suggested motifs of Reiki were proven to lower users' cortisol, or a main stress hormone, thereby allowing them to offering physiological relief. Its non-invasive character consequently also implies that it can operate with any individuals with mobility handicaps, as the technique can be targeted towards those living in cities who become paralysed by their own circumstances, health situations, and so on that extend outside of the access that is reasonable for their master's therapy. Furthermore, it can also diminish their fear as the technique has calming components that would simultaneously aid them into feeling safe surprisingly for individuals facing existential dread that originate from eco-anxiety.

It is through the synergistic blend of hypnosis's cognitive reframing and Reiki's energy restoration that these two approaches are most beneficial in the multi-dimensional emotional and physical cost of eco-anxiety, offering a holistic framework for both mind and body in regard to urban environmental strain. Through the very interaction of hypnosis and Reiki, this synergy can further lead to a deeper therapeutic effect, given that each of them addresses both the psychological and physical sides of the spectrum — while the former focuses on the mind inherent within the therapeutic, the latter aligns with the physical and energetic realm of an individual — there is no looking over potential causes or effects of an emotionstruck man or woman who's very being's under attack through the magnitude of ecological concerns within a global, such as in Hong Kong.

Transpersonal Psychology and Nature Connection's Theoretical Foundations

Transpersonal psychology offers an astute theoretical outlook for understanding the inherent healing potential of nature connection in ameliorating eco-anxiety, which lies in the consistent evolution of consciousness from the ego, thus creating a sense of union with the environment. Grof (2000, p. 18) posits that such an approach aligns the spiritual and ecological spheres with one another, allowing people to transcend their distress, reconnect with the state of nature, and once more associate with the rest of what exists. This is clearly relevant to those living in urban Hong Kong, where bodily and psychological detachment from nature promotes eco-anxiety. The concept of mindfulness — namely, the awareness of the present moment — articulated by Kabat-Zinn (1990, p. 145) aligns well with this, enabling people to mitigate their inclination toward rumination over the imminent threat of a heated climate change and embrace greater emotional resilience. This method consequently enables people to find ground amid volcanoes of devastating stories regarding the collapse of social order.

Drawing upon Kaplan's Attention Restoration Theory (1995, p. 172), the presence of natural environments promotes psychological recovery since it allows controlled, aimed attention to return and reverses brain fatigue. For those megalomaniacs who have been overwhelmed by ecological issues, their daily nature-based activities, such as observing the view from Tai Mo Shan or practicing outdoors mindfulness in Victoria Park, may prove a healing physical barrier that helps decrease anxiety levels and clear the mind from searching for solutions. Adhering to the study's use of imagery of nature in hypnosis and mindfulness exercises, this theoretical phrase seeks to nullify the divide between urban and nature as well as connecting to both worlds. Furthermore, Pihkala (2020, p. 7) suggests that the reconnection with nature decreases existential dread — the central component of eco-anxiety — by restoring the mind's sense of belonging and making them feel more helpful as individuals. The motivation to take charge and create change is by encouraging them to grow plants in community and to start practicing ecological thinking, illustrating a shift out of despair into agency.

The adoption of such principles into a transpersonal framework offers a multidimensional approach; the spiritual, cognitive, and emotional aspect of eco-anxiety. This matter is significant in Hong Kong's urban setting as there is limited access to nature, that's puts more stress on the psyche. Hence, melding what transpersonal psychologists might say with empirical research in the field of attention restoration and mindfulness, this study has a foundation for the intervention, implying that when administered it can not only heal people but to increase the community's overall resilience to climate-related adversity. Future developments may focus on how such metaphors can be executed on urban populations across the globe, improving both the mindset and the environment.

Methodology

This included a qualitative case study design that investigated the effectiveness of incorporating Ericksonian hypnosis and Reiki therapy into a transpersonal counseling framework to mitigate eco-anxiety among Hong Kong residents. Case studies are a suitable form of inquiry used in order to conduct a deeper analysis of the unique journey asked from the one subject on a particular social establishment (Yin, 2014, p. 16). With this method came in play, therefore it would be ideal for examining the outcomes of therapies. The case study design incorporated a retrospective reconstruction of counseling practices conducted spanning several years for the researcher to capture alterations of psychological changes and behavioral alterations among participants.

Participants — three participants were selected on purpose from the researcher's counseling practice whose identities was described and anonymized as Cases A, B, and C so that the research does not go beyond privacy. A 22-year-old female university student majoring in Environmental Science (Case A) identified as having eco-anxiety triggered by a recent breakup and serious climate change data exposure at school, manifesting as persistent worrying, sleepless nights, and feelings of despair towards the collapse of Earth. A 45-year-old married male financial manager with two children (Case B) displayed

work-related stress and eco-anxiety triggered by Hong Kong's increasing air pollution and heatwaves fear for his children's future environment and expressed guilt regarding carbon emissions and carbon footprint. Finally, a 52-year-old female homemaker struggling with chronic fatigue syndrome (Case C) showed amplified eco-anxiety due to mobility limitations impeding access to nature and constant news broadcasts regarding intense typhoons trapping her within the aging tenement on Hong Kong Island with no view of greenery. The selection criteria included the identification of eco-anxiety symptoms specific to self-report by the participants displaying chronic distress due to climate change or other environmental issues throughout their lives; admission of all details during the initial search interview to confirm the initial report; confirmation of returning willingness to participate in the 8-week interdisciplinary intervention; and a final assessment of eligibility (i.e., residing in Hong Kong during the study time period), so that each participant's reported symptomology could be evaluated relative to the urban clinical setting.

Intervention The intervention spanned 8 weeks, with each participant attending one 60-minute session weekly (totaling 8 sessions), conducted in a private counseling room or via secure video calls for Case C due to her mobility constraints. The protocol integrated three complementary modalities tailored to participants' needs:

1Ericksonian Hypnosis: Participants entered a trance state through a 5-minute progressive relaxation (e.g., deep breathing, muscle release), followed by 20 minutes of indirect suggestions and guided imagery of Hong Kong landscapes—Tai Mo Shan's misty peaks for Case A, Sai Kung's serene beaches for Case B, and Pok Fu Lam Reservoir's tranquil waters for Case C—to foster emotional regulation and inner security (Erickson & Rossi, 1979, p. 34). Imagery was customized based on participants' familiarity with these sites.

2Reiki Therapy: Hands-on energy balancing for Cases A and B, or remote for Case C, targeted specific chakras—heart and solar plexus for Case A (emotional distress), root and throat for Case B (grounding and expression), heart and root for Case C (emotional-physical support)—lasting 20 minutes per session to reduce stress and enhance well-being (Miles & True, 2003, p. 62). Sessions concluded with a 5-minute integration period.

3Mindfulness Practice: Participants were assigned daily 5-10 minute exercises—nature observation walks in Victoria Park for Case A, family walks in Sai Kung Country Park for Case B, and home-based deep-breathing meditation with nature documentaries for Case C—to reinforce nature connection and present-moment awareness (Kabat-Zinn, 1990, p. 145). Compliance was tracked via self-reported journals.

The researcher, a certified Ericksonian hypnotist and Reiki master, delivered all interventions, ensuring consistency and expertise across sessions.

Data Collection Data

Data Collection Data were collected pre- and post-intervention using the Eco-Anxiety Scale (EDS), a validated 13-item self-report tool assessing climate-related distress (Hogg et al., 2021), with scores ranging from 0 to 100 (higher scores indicating greater anxiety). Pre-intervention scores were derived from intake assessments documented in session logs, while post-intervention scores were reconstructed from final session reflections and follow-up discussions, supplemented by researcher notes. Semi-structured interviews (15-20 minutes) were conducted post-intervention via audio recording, transcribed verbatim, and analyzed for thematic shifts (e.g., "How has your perception of nature changed?"). Retrospective reconstruction followed Stake (1995, p. 78), relying on detailed session records and memory to ensure accuracy.

Ethical Considerations

This study is a retrospective analysis of past counseling practices, and formal ethical approval from an institutional review board was not obtained as the data were collected prior to the study's research designation and involved no new interventions. However, the research adhered to APA ethical guidelines (American Psychological Association, 2020, p. 11). Informed consent was obtained verbally during initial consultations, documented in session notes, and reaffirmed for this retrospective use. Participants were informed of the study's purpose, procedures, and voluntary nature, with no coercion reported. All identifiable data were anonymized by removing names and specific locations, and records were stored securely in an encrypted digital database accessible only to the researcher, minimizing risks from these non-invasive techniques. The author declares no conflicts of interest that could have influenced the research.

Results

This section presents results from a 8-week intervention, combining Ericksonian hypnosis, Reiki therapy, and mindfulness, to treat three Hong Kong residents experiencing eco-anxiety. The implementation of the approach is followed by mechanism of action analysis and social implications. Through qualitative case study methodology, the study canvases the response of individuals to a customized program that aims to minimize the distress surrounding climate change and a personal interconnection in a urban environment. Data shared before and after the intervention – including pre-intervention Eco-Anxiety Scale (EDS) as well as post-intervention EDS and participant self-report – illustrate success of the treatment approach. Following case illustration, three participants are detailed: one, a young female student; two, a middle-aged male manager; three, a middle-aged female homemaker – detailing changes in anxiety with a breakdown of how they have been emotionally resilient. In conclusion, subsequent discussion relates the results to theoretical justification and societal issues.

Case Analysis

Case A: 22-Year-Old female university student Case A, entered the study with an EDS score of 65, reflecting high-level collective eco-anxiety triggered by a recent breakup and exposure to alarming climate-related data during her study. Over 8 weeks, she underwent weekly sessions comprising hypnotic storytelling of Tai Mo Shan's misty forests, Reiki energy balancing targeting her heart and solar plexus chakras, and mindfulness walks in Victoria Park. She reported an initial inability to shake her intruding thoughts about the forthcoming climate collapse in Week 1 - "I couldn't stop picturing floods/wildfires". In Week 3, she recorded a change in the attitude - "When my self-hatred was peeking through last week, I felt lighter after Hypnosis", where she then explained, 'The forest imagery made those stats feel distant—like I could breathe again'. Reiki sessions progressively dissipated her emotional turmoil before she reported reflections of a "warmth" in her chest over the span of Week 5 that lasted for a longer period, resulting in the decrease of her nighttime anxiety spirals less often. Her EDS score also decreased further, from 65 to 45. That is, a drop to her EDS score by 20 points. One of the following statements makes it clear to see changes and impressions throughout the course of the intervention that occurred as a result of Reiki and Hypnosis: During her last interview, she said: "I used to feel the world was ending soon but now nature shows me hope so I can start over". Apart from decreased anxiety, she demonstrated far more emotional stability, better sleep quality (she went to bed in 20 minutes rather than hours), and she became involved in various university-related environmental improvement programs. Several months later, she still followed the same pattern: no despair anymore but the initial urge to take active part in improving the environment wanted to remain. "Actually, planting trees makes me feel like fighting back," she said.

Case B: 45-Year-Old Married Male Manager | Case B explained that 45-year-old case manager was a married dad of two who was initially motivated by chronic work-related stress and early fears about the ecological future of his children as Hong Kong's air pollution increased and started a heatwave. In addition, his tools included hypnotic visualisations (sensory deprivation visualisations of serene beaches of Sai Kung), Reiki targeted at root and throat chakras, and family walks to Sai Kung Country Park. He presented with difficulty relaxing at the start (in Week 1 he admitted, "I kept checking my phone, I was too tense to focus"), and the earliest sessions suggested that Reiki made him feel more grounded by increasing his sense of entropy. At Week 4, he said how hypnotic beach scenes felt as a "mental escape"; "The waves drowned out my deadlines". Reiki was also helpful for him in enhancing his sense of grounding. At Week 6, after therapy, he noted that the way he decided on things became clearer: "I can talk about pollution with colleagues without panicking". His EDS score decreased to 35 post-intervention, a 20-point decline. He said 'I realize that everything isn't up to me, but just being outside and connecting with nature has calmed my nerves.' Then moved out here, and he stopped using a lot of plastic around the house, started recycling with his kids and showing them how to separate the waste, and also—it let us grow closer as a family when we'd go places like the park or the beach. His wife responded back, "He's less snappy at dinner tonight" implying that this change has now changed his life, and it hasn't been diminished yet and will continue to be a change for much longer.

Case C: 52-Year-Old Female Homemaker with Health Issues Case C, a 52-year-old homemaker, was diagnosed with chronic fatigue syndrome. During the session, she provided an EDS score of 60, with her condition being exacerbated because she was confined indoors with limited access to nature and was constantly exposed to news about typhoon and climate disasters. As indicated in Case C, a series of hypnotic images of the calm waters of Pok Fu Lam Reservoir, remote Reiki focusing on the heart chakra and root chakra, and mindfulness breathing at home were all practiced by this female patient, who admits that she did not believe that it would benefit her at first. Later, in Week 1, she said in response to a question: "I doubted this could help – I'm stuck indoors." In Week 2, she talked about how she was feeling "a calming effect" after going through a few Hypnosis. She also stated that "The water sounds made my mind to stop racing". After Week 5, she commented that she felt "an energy lifting my tiredness". From a detailed examination of her fatigue ratings before and after intervention, it is clear that her EDS score was reduced after the intervention: from 60 before the intervention, it decreased to 40 after it was completed, a total 20-point improvement. "Can't go outside much anymore, but I am connected with nature and not so afraid of it," she said alongside the slight improvements of her health, the blossoming of an interest in taking care of indoor plants, starting off with a small fern inside her house. Her family noted how much happier she seemed, and her daughter added on by saying "She smiles more and has actually asked me to water her plants" suggesting that although she wasn't able to physically stretch her legs far she was still affecting her community through gifting plants to her neighbors.

Therapeutic Mechanisms and Theoretical Links

The consistent 20-point reduction in Eco-Anxiety Scale (EDS) scores across all three cases underscores the efficacy of integrating Ericksonian hypnosis, Reiki therapy, and mindfulness practices in alleviating eco-anxiety. This section elucidates the mechanisms driving these outcomes and situates them within established psychological and environmental frameworks, linking them directly to the experiences of Cases A, B, and C.

Indirect Suggestion & Nature-Based Imagery as Emotional Regulation Ericksonian hypnosis utilized indirect suggestion and nature-based imagery to regulate one's emotional status. For Case A, when she visualized the Tai Mo Shan forests, her mind shifted the enthymeme toward resting on that condition of being rather than towards despairing about the climate that occurred as "utilize the unconscious mind to reframe perceptions" suggested by Erickson and Rossi (1979), p. 34. She reported by Week 3, "the forest made those stats feel quite far away," which illustrates how hypnosis rendered her distance from the overwhelming data. In addition, Case B's Sai Kung beach imagery served as a mental escape that reduced stress as it introduced relaxing natural cues to his subconscious fixing it within him as he declared "The waves drowned out my deadlines" because of its comforting effects. Case C's Pok Fu Lam Reservoir scenes also fostered inner strength despite physical limits, as she reported in Week 2's report, "My mind just stopped racing". This can relate to research suggesting that hypnosis increases the emotional stability of participants by giving them access to higher levels of cognition (Yapko, 2012, p. 102) as they found that the individuals were able to interpret their eco-anxiety differently in terms of a less threatening fear that

could be managed instead of their eco-anxiety being an endless threat to them, which was observed throughout all three individuals.

Reiki therapy used complementary hypnosis to address energetic imbalances related to anxiety. For Case A, target treatment aimed at the heart and solar plexus chakras released emotional suppression, as by Week 5 her “warmth” sensation was attenuated; thereby, physiological stress was lessened to a benefit “attributed to Reiki, the ability to... enhance wellbeing through the flow of energy” (Miles & True, 2003, p. 62). Outcomes of case B demonstrated improvements both in root and throat chakras; thereby, he reported strengthening in ‘grounding’ and communication; this enhanced self-comprehensibility facilitated activity at work from which “I can talk without panicking” by Week 6. Indeed, stress induces physiological stress and a central nervous system (Cns) response that incites a survival mechanism, resulting in physiological stress; afterward, the biological system treats the symptoms. Case C was focused on the heart and root chakras. She struggled with combining theoretical ideas and applied knowledge successfully, therefore by completing target focus brought relief from fatigue, and “an energy lifting my tiredness” contributed to fewer episodes of fatigue; therefore, physical tension was lessened. A study found that Reiki “decreased cortisol output and promoted relaxation” (Wardell & Engebretson, 2008, p. 45), thus suggesting an application in ameliorating the eco-anxiety: somatic manifestation — particularly mandatory for case C’s physical limitations.

The practice of mindfulness strengthened these effects by helping foster a persistent sense of connectedness to nature, which would be most critical in an urban environment such as Hong Kong. Victoria Park’s (Case A) walks in Hong Kong’s Victoria Park changed her perspective from academic pessimism towards more active optimism as she said, “I saw life in the trees.” As stated previously, doctor’s frequent visits to the family cabin in Sai Kung (Case B) helped reinforce familial eco-consciousness more broadly, as he became actively engaged with his children, showing them how to recycle, saying “It’s a team effort now.” Lastly, and perhaps most evidently in shape with Kaplan’s (1995) Attention Restoration Theory (ART), breathing exercises including expansion through yoga were used by case C to bridge the gap between the indoors and out-of-door world, as evidenced by her consistent care for plants outside as she later described her efforts as “my little forest.” In line with this, Kaplan (1995) argues that “natural environments restore directed attention and reduce mental fatigue” (p. 172), stipulating that these in-natural settings will foster greater resilience against eco-anxiety. In line with the influence of natural environments on reducing rumination over future climate and natural disasters, Kabat-Zinn (1990) utilises his mindfulness framework to explain how “present-moment awareness... undermines rumination about future climate conditions” (p. 145), which was largely absent in all three cases, soon compared to a decrease in fascination with apocalyptic winter scenarios.

In theory, modeling these outcomes relate to transpersonal psychology’s precepts of expansive consciousness coupled with interlocking concern for humanity (Grof, 2000, p. 18). In fact, the intervention’s combination of nature imagery and energy work created a feeling of a united dispersal with the environment, blunting the alienating consequences of eco-anxiety – Case A’s “hope in nature”. Furthermore, Pihkala’s (2020) analysis of eco-anxiety elaborates on how “reconnecting with nature removes existential dread” (p. 7). From this perspective, this integrative therapy holds not only its healing potential but also its restorative nature for individuals who will be compelled to forfeit ecological parity as we have seen in Case B’s family eco-endeavours. The amalgamate effect of these modalities – Hypnosis unleashing one’s subconscious capacity, Reiki restoring one’s energetic state and mindfulness reintegrating a person’s awareness — provide a framework for tackling climate-related psychological burdens that exists amongst populace residing in urban centers who experience environmental disconnection.

Discussion

The results of the three case studies inform us of the tremendous social value of implementing Ericksonian hypnosis, Reiki therapy, and mindfulness to tackle eco-anxiety, especially in dense urban areas such as Hong Kong. Individual’s EDS scores have reduced by an average of 20 points (i.e., from 65 to 45, 55 to 35, and 60 to 40 for Cases A, B, and C, respectively) at the time of having received different therapeutic interventions, demonstrating an observable shift in their mental well-being. Thus, the relief in eco-anxiety not only makes participants emotionally stronger but also improves their quality of life. For example, from being in despair (Case A) to becoming active in planting trees (organizing tree-planting events for more than 30 students). This demonstrates the shift towards the reclamation of agency. Moving to Case B and C as they integrate environmentally friendly habits with their own families (e.g., cutting down on plastic use for reusable bags). Lastly, the change in interest towards houseplants for Case C (gifting neighbors ferns). These results explain how therapeutic interventions can enable individuals to act upon climate-related distress. These personal transformations proved crucial in a densely populated urban area where the psychological distress of urban density coupled with the scarcity of green space can amplify the burdens of living in the city (Chan et al., 2013, p. 579) thus creating a sense of purpose to counter one’s feelings of helplessness.

On a more general societal scale, the success of the intervention implies a chain reaction that would like to address the urgent needs of Hong Kong’s burgeoning environmental and social crises. The behavioral changes that were evident from Case A’s on-campus activities; Case B’s parenting education on family recycling; and Case C’s plant sharing walks and activities reflected how reducing the eco-anxiety of these participants fostered sustainable actions, which conformed with Pihkala’s (2020, p. 7) assertions that returning to nature reduces the existential dread often felt by individuals and could inspire collective action against climate change in urban cities which provides a sense of unity and could heighten social resilience. In addition to specific actions, these changes may lead to broader community-level interventions such as neighborhood cleanup spearheaded by residents (Case B), or support for green space conservation that will emanate from a local perspective on green space planting as exemplified by Case A, thereby magnifying the scope of the intervention to have a greater impact on the urban fabric of Hong Kong, and reduce a collective sense of ecological indifference in the world around them.

As far as these synergistic approaches are concerned, their practical applicability is of great value to both mental health practitioners and community initiatives – with examples such being adaptation of the integrative network into counseling

programs targeting urban populations with Higher Eco-Anxiety (for example, students, working professionals, and individuals with movement limitations). A program lasting about 4 weeks that incorporates bi-weekly sessions of Hypnosis, using concepts of local imagery/fiction (for example, in Lion Rock) alongside weekly sessions of Reiki, tailored to an individual's emotional needs. Projects that occur in the community include monthly nature-based mindfulness workshops held in areas such as Kowloon Park or subsidized Reiki sessions at a community center, with the use of limited yet easily-accessible green spaces found throughout Hong Kong. Future research shall examine how to scale this intervention up in a randomized controlled trial that will attack the epidemic with diverse populations (including perhaps a school or workplace scale-up). In addition, more collaboration with environmental organizations would be beneficial, such as Green Sense, to bring together mental health support along with sustainability education and offer joint workshops on eco-anxiety and ways to reduce waste; help influence the policy so that the Hong Kong government would at least fund some green urban planning initiative, whether a rooftop garden or more park space e.g. embed mental health benefits in environment plans to make the world healthier and more sustainable structurally. Implementing this multidisciplinary approach will make sure to leave an impact on fellow citizens' distress in their own right, even if not individually, while contributing to a solution culturally relevant and replicable in other cities globally who are suffering from the same urban climate as Hong Kong.

Conclusion

This research report demonstrates the power of merging Ericksonian hypnosis, Reiki healing, and mindfulness orientations into a transpersonal counselling framework to reduce the prevalence of eco-anxiety amongst Hong Kong residents. From a downward trend in the average score of the Eco-Anxiety Scale (EDS) (from 65 to 45 in Cases A, B, and C) with qualitative self-reports showing many reported reduction in their severity of climate-related distress, it is evident that such an approach is successful in removing the erroneous beliefs that have otherwise impelled them towards feelings of anger or resentment towards their surrounding environment. Case A's transition from a state of being unable to discern a way out of her despair, through turning a researcher and volunteering in various sustainability initiatives around town, Case B's move to more sustainable family-oriented habits, and Case C's overall stress levels gone before she could connect with her isolation due to his physical limitations provide evidence that such an endeavour both removes some sense of anxiety inducing desperation and promotes a greater sense of emotional stability and willingness to become more active with their current environment. These results suggest the power of the present intervention to provide an individual with greater freedom to function in an urban environment where the environmental stresses are increased with irreducible factors such as population density and green space availability (Chan et al., 2013, p. 579).

This practical application is significant for all mental health practitioners and community leaders in Hong Kong. The model can easily be reshaped into different counseling programs dedicated specifically for an urban population, such as students, professionals, or individuals with mobility or mental health challenges: one with a pragmatic mix of techniques involving hypnosis, Reiki, and mindfulness to help people alleviate eco-anxiety. Community projects could make use of this model in the form of workshops readily available to anyone interested in relieving their emotions in a way that includes local landscapes to be utilized for therapeutic purposes. Such workshops would aid in improving the wellbeing of residents' mental conditions while simultaneously shaping their development of an understanding of ecology and the environment. Collaborating with environmental groups may also help expand its reach through a partnership that includes psychological support while implementing a more sustainable viewpoint on living, helping to instigate a broader change in behaviour. Such practical applications for the model are consistent with Pihkala's (2020, p. 7) insight that reconnecting with nature relieves existential dread, thus viewing it as a two-fold advantage; not only does it benefit other individuals by treating them but also contributes to maintaining society stable.

Looking forward, this study's preliminary findings warrant further exploration through larger-scale research. Randomized controlled trials could validate the intervention's efficacy across diverse demographics, potentially refining its modalities for scalability. Longitudinal studies might assess the sustainability of participants' behavioural changes, such as Case A's environmental activism or Case B's family eco-practices, offering deeper insights into long-term impacts. Given the retrospective nature of the data, future efforts should prioritize real-time data collection to strengthen empirical rigor. This integrative approach provides a culturally relevant blueprint for Hong Kong, with potential adaptability to other global cities grappling with urban eco-anxiety, paving the way for holistic solutions to climate-related psychological challenges.

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Conflict of Interest

The author declares no conflicts of interest that could have influenced the design, conduct, or reporting of this research. There are no financial or personal relationships with any individuals or organizations that might bias the work presented in this manuscript. The author holds certifications as a Certified Hypnotist and Certified Advanced Ericksonian Hypnotist from the

American Alliance of Hypnotists, as well as designations as a Master of Usui Reiki and Holy Fire Reiki. The author is also a member of the International Reiki Organization and the Reiki Healing Association. These professional affiliations and certifications are unrelated to the funding or execution of this study and have no bearing on the reported findings. The study was conducted independently, and all data were collected and analyzed without external influence.

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