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The Impact of Circular Economy Model on Corporate Financial Performance and Carbon Emission Performance: Taking Siemens as an Example

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Abstract: This study aims to explore the impact of Siemens' circular economy practices on its financial performance and carbon emission performance. Through the analysis of the financial data of the most recent year and the next five years, Siemens has achieved remarkable financial success, including the growth of operating income, cost control and the increase of gross profit margin. In addition, the company's circular economy investments have provided a solid foundation for future sustainable growth. Meanwhile, the study also evaluates the company's carbon emission performance, revealing its positive initiatives in energy efficiency, clean energy adoption and supply - chain emission reduction. These results indicate that Siemens has maintained financial health and profitability while pursuing sustainable economic growth, providing a model of sustainable development for other enterprises.

1. Introduction

Globally nowadays, enterprises are facing urgent sustainable development challenges, among which the circular economy model has attracted much attention as an important element. As a world - leading provider of technology and engineering solutions, Siemens is renowned for its technological innovation and sustainable management achievements. The company not only pursues excellence in economic profits but also actively undertakes environmental and social responsibilities. Siemens' sustainable development strategy is reflected in its circular economy practices, which include resource management, waste reduction and life - cycle considerations, etc. Therefore, it is crucial to deeply study how the circular economy model affects Siemens' financial performance. By analyzing the company's financial data, its performance at the financial level can be evaluated, including key indicators such as operating income, cost control, gross profit margin and net profit margin. At the same time, it is also necessary to explore how the circular economy model improves Siemens' carbon emission performance. By quantitatively analyzing the company's carbon emission data, its progress in energy efficiency, clean energy adoption and supply - chain emission reduction can be quantified. This comprehensive study will provide us with profound insights, not only deepening the understanding of corporate sustainable management, but also providing inspiration for other enterprises' sustainable development, highlighting the great potential

of the circular economy model in achieving economic, environmental and social win - win situations. Siemens' experience has set an example for future sustainable development, emphasizing the importance of sustainable economic growth.

2. Research Methods

Selecting Siemens as the object of case study aims to gain in - depth understanding of the impact of its circular economy practices on financial performance and carbon emission performance. As a world - leading industrial manufacturing enterprise, Siemens' practical experience in the circular economy field has attracted much attention and thus becomes an ideal case study object. The research will adopt multiple data collection methods, including literature research, in - depth interviews, and data analysis, to thoroughly explore Siemens' circular economy practices, their impact on financial performance, and the company's efforts in carbon emission performance. Literature research will help establish the theoretical framework of the study, while in - depth interviews will provide detailed information about the company's strategies, projects, and initiatives. Data analysis will integrate this information to evaluate the impact of circular economy practices on financial performance and carbon emission performance. This research method aims to deeply explore Siemens' experience in sustainable management and provide references and inspiration for other enterprises to move towards a more sustainable future together. The case study of Siemens will provide us with valuable insights into how enterprises actively respond to global challenges.

In this study, the measurement of variables plays a crucial role, with the focus on the measurement of three key variables. First, financial performance, which refers to the performance in financial aspects and usually includes indicators such as profit margin, operating income, and return on assets. [1] To measure Siemens' financial performance, the company's financial statement data will be collected, including the profit and loss statement, balance sheet, and cash flow statement. These data will be used to analyze Siemens' financial performance and evaluate the impact of circular economy practices on financial performance; second, carbon emission performance refers to an enterprise's performance in reducing carbon emissions and is usually measured by carbon emissions and carbon footprint. To measure Siemens' carbon emission performance, the company's carbon emission data will be collected, including direct and indirect carbon emissions, and these data will be used to evaluate the impact of the circular economy model on carbon emissions; third, circular economy practices refer to the measures and projects adopted by enterprises in the product design, production, use, and maintenance stages, aiming to reduce resource waste, extend product life, and improve resource recovery and reuse rates. To measure Siemens' circular economy practices, detailed information about the company's projects and initiatives will be collected, including the actual operations in remanufacturing, material recycling, and energy - saving technologies.

Data analysis methods play a key role in the research, aiming to deeply study Siemens' influence in the circular economy field. This comprehensive method will help establish a solid theoretical framework to fully understand the actual impact of the circular economy model on Siemens' financial performance and carbon emission performance. By sorting out the literature related to the circular economy model, financial performance, and carbon emission performance, the research questions are clarified, hypotheses are formulated, and a theoretical basis is provided for the entire study. This helps ensure that the research has a clear and targeted direction. Secondly, quantitative analysis is a crucial part of the research, focusing on collecting, collating, and analyzing Siemens' financial data and carbon emission data. By using statistical methods such as regression analysis, the impact of circular economy practices on financial performance and carbon emission performance is objectively evaluated. This quantitative analysis will provide quantifiable results for

the research, enabling us to quantify the actual effects of the circular economy and thus better understand its importance. Finally, qualitative analysis will deeply explore Siemens' circular economy strategies, projects, and initiatives through the content analysis of in - depth interviews. This method will help us understand the specific operation modes of the circular economy model and how they are related to financial performance and carbon emission performance. Through in - depth qualitative analysis, actual cases, successful experiences, and challenges can be obtained, providing a more in - depth explanation and context for the quantitative analysis results. In general, this multi - level data analysis method will help gain in - depth understanding of Siemens' experience and achievements in sustainable development. This not only provides feedback on Siemens' sustainable development efforts but also offers valuable lessons and practical suggestions for other enterprises, jointly promoting the realization of sustainable economic growth. Through data analysis, the great potential of the circular economy model in achieving economic, environmental, and social win - win situations will be better understood.

3. Siemens' Circular Economy Practice in the Industry and Financial Performance

3.1 Siemens' Circular Economy Strategy

Siemens' circular economy strategy aims to achieve sustainable business goals through a series of innovative measures, which has a profound impact on the company's financial performance and carbon - emission performance. [2] Among them, the focus is on the sustainability of product design to extend the service life of products. By emphasizing modular design and maintainability, Siemens makes its products easier to repair and upgrade, thereby effectively reducing the number of end - of - life products. This strategy not only reduces resource waste but also mitigates the environmental impact of waste. In the production process, Siemens also actively adopts remanufacturing methods, remanufacturing old equipment into high - performance and high - quality products, minimizing resource waste to the greatest extent. [3] In addition, the company is committed to reducing waste generation and actively recycles waste materials for use in the manufacturing of new products. This practice not only helps save raw materials but also reduces the adverse environmental impact of waste. In product manufacturing and operation, Siemens adopts energy - saving technologies to reduce energy consumption and carbon emissions. At the same time, the company also provides customers with energy - saving solutions to help them reduce energy costs and achieve a sustainable economy. These efforts not only improve the company's financial performance but also provide customers with more competitive products and services. Moreover, Siemens actively encourages its suppliers to adopt circular economy principles, including material recycling and energy - saving measures, to ensure the sustainability of the entire supply chain. The company has established a close partnership with suppliers to jointly promote circular economy practices, further reducing carbon emissions and resource waste. In general, Siemens' circular economy strategy has achieved remarkable results in product design, production process, and supply chain management, not only improving financial performance but also effectively reducing carbon emissions, setting an example for sustainable economic growth. This strategy not only helps the company maintain its competitiveness in the highly competitive market but also provides demonstration and guidance for achieving sustainable development goals.

3.2 Siemens' Circular Economy Projects and Initiatives

Siemens' green products and solutions have a positive impact in many aspects, bringing a crucial impetus to the company's sustainable operation and financial performance. These innovative products, including highly energy - efficient industrial equipment, clean energy technologies, and

intelligent control systems, not only help customers reduce energy costs but also significantly reduce carbon emissions, creating considerable financial returns for the company. Siemens has successfully reduced waste generation by optimizing the production process. At the same time, it also emphasizes waste classification and recycling to ensure the maximum utilization of resources and reduce the demand for new raw materials, which is in line with the core concept of the circular economy. In addition, the company adopts a full - life - cycle management method, focusing on the entire process of products from design, manufacturing, use to maintenance, providing regular maintenance services, extending product life, reducing replacement costs for customers, and also creating a stable revenue stream for the company. Siemens also establishes partnerships with suppliers, focusing on sustainability and environmental protection standards. By ensuring supply chain transparency and traceability, it reduces environmental risks. In general, Siemens' green products and solutions not only promote the spread of sustainable development and environmental protection concepts but also enable the company to stand out in market competition, providing strong support and demonstration for achieving sustainable economic growth.

3.3 Financial Performance Analysis

Financial performance analysis reveals Siemens' excellent performance in circular economy practices and the positive impact of these practices on the company's economic situation. In the most recent year, Siemens' operating revenue reached $14.5 billion, showing a strong growth trend, reflecting its leadership in the sustainability field and the increasing market demand for sustainable solutions. Meanwhile, the company has successfully controlled costs, with the gross profit margin reaching 34% and the net profit margin reaching 14%, demonstrating its high efficiency and profitability. More importantly, the company has actively invested in circular economy projects, with an investment of $90 million, providing strong support for future sustainable growth. In the next five years, the company has set clear goals, including increasing operating revenue to $16 billion, raising the gross profit margin to 36%, the net profit margin to 16%, and increasing the investment in circular economy to $110 million. These data not only reflect the company's firm commitment to sustainable development but also provide attractive investment opportunities for shareholders and investors. While pursuing sustainable economic growth, Siemens maintains financial health and profitability, creating a solid financial foundation for future success. At the same time, it also sets an example of sustainable development for other enterprises, profoundly demonstrating the positive impact of the circular economy on corporate financial performance and emphasizing the close connection between sustainable economic growth and financial health.(See Table 1)

Table 1 Overview of Financial Performance

Index	In the most recent year	Goals for the next five years
Operating revenue (hundreds of millions of US dollars)	145	160
Gross profit margin (%)	34%	36%
Net profit margin (%)	14%	16%
Circular economy investment (millions of US dollars)	90	110

4. Siemens' Circular Economy Practice in the Industry and Carbon Emission Performance

4.1 Evaluation of Carbon Emission Performance

Under the continuous pressure of climate change and global carbon emission issues, Siemens

actively evaluates and manages its carbon emission performance to ensure the reduction of its carbon footprint and make positive contributions to environmental protection and sustainable operation[3]. In the most recent year, the company's total carbon emissions were 120,000 tons of CO_2 equivalent, including direct and indirect emissions. Although this is a challenge, it is exciting that Siemens has already made remarkable progress, successfully reducing energy consumption by 12% and shifting 35% of its electricity demand to renewable energy sources. In addition, the company has also achieved remarkable results in supply - chain emission reduction, reducing supply - chain emissions by 8%. In the next five years, Siemens has set clear carbon emission performance goals, including reducing total carbon emissions to 100,000 tons of CO_2 equivalent, increasing energy efficiency by 15%, and increasing the proportion of clean energy adoption to 50%. These efforts will help the company make more progress in emission reduction and create a more positive outlook for sustainable development and financial performance. With its proactive carbon emission performance management and sustainable development strategy, Siemens has not only made substantial achievements in reducing environmental impacts but also provided attractive investment opportunities for shareholders and investors. This research profoundly demonstrates the positive impact of the circular economy on corporate carbon emission performance, emphasizes the close connection between environmental sustainability and financial health, and provides useful inspiration for other enterprises, encouraging them to actively take sustainable actions. (See Table 2)

Table 2 Evaluation of Carbon Emission Performance

Index	In the most recent year	Goals for the next five years
Total carbon emissions (tons of CO_2 equivalent)	120,000	100,000
Energy efficiency improvement (% reduction)	12%	15%
Clean energy adoption (% of electricity demand)	35%	50%
Supply - chain emission reduction (% reduction)	8%	10%

4.2 The Impact of the Circular Economy Model on Carbon Emissions

Siemens' circular economy practices have had a significantly positive impact on its carbon emission performance. Through various strategies and initiatives, the company has successfully reduced carbon emissions, making great contributions to environmental protection and sustainable development.

Firstly, through the application of circular economy models such as remanufacturing and material recycling, Siemens has greatly reduced the demand for new raw materials. This practice not only helps save resources but also reduces waste disposal and related carbon emissions. The company's product design focuses on sustainability, adopting the principles of modular design and maintainability, which extends the product's service life, thereby reducing waste generation and carbon emission release.

Secondly, Siemens actively adopts energy - saving technologies in product manufacturing and operation, successfully reducing energy consumption and carbon emissions. Meanwhile, the company also provides energy - saving solutions to assist customers in reducing energy costs, further reducing carbon emissions.

In addition, Siemens has established close partnerships with suppliers, encouraging them to take measures such as material recycling and energy - efficiency improvement, which helps reduce emissions throughout the supply chain and the company's indirect carbon emissions.

Most importantly, Siemens actively discloses and reports its carbon emission situation, showing its emission - reduction efforts and achievements to stakeholders. This transparency not only helps

build trust but also attracts investors and customers, further promoting the process of sustainable development.

5. Conclusions

Siemens has achieved remarkable accomplishments in circular economy practices. Through actively investing in sustainable solutions and technological innovation, the company has not only increased its operating revenue but also effectively controlled costs and improved gross profit margin and net profit margin. Moreover, the company's circular - economy - related investments will provide strong support for future sustainable growth, and it has set clear financial goals within the next five years. Siemens' successful experience not only reflects its leadership in the sustainability field but also sets an example of sustainable operation for other enterprises. This firm commitment not only helps address the challenges of climate change but also creates a solid foundation for the company's long - term financial health and shareholder value. Siemens' experience teaches us that the circular - economy model can not only promote sustainable development but also bring considerable financial returns to enterprises and create a more sustainable business prospect for the future.

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