

Plastics Circular Economy and a Sustainable Future: A Strategic Comparative Analysis for SABIC's Competitive Advantage

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Abstract: This study aims to conduct a comparative analysis of the environmental recycling technologies and strategies of SABIC, BASF, and LG Chem to derive actionable insights to enhance SABIC's competitiveness. The main research methodology utilizes Porter's Five Forces, SWOT, and VRIO frameworks and includes an extensive literature review and case analysis. Global chemical companies' strategies on plastic circular economy and eco-friendly recycling technologies exhibit several commonalities while leveraging distinct approaches to achieve unique competitiveness. All three companies focus on advancing chemical recycling, mechanical recycling, and bio-based technologies to realize a circular economy. SABIC's TRUCIRCLE™ program accelerates the transition to a circular economy by converting plastic waste into high-value products. BASF's ChemCycling™ project transforms mixed waste into new chemical feedstocks through pyrolysis, while LG Chem employs supercritical pyrolysis processes to enhance the circularity of plastic resources. To maintain its competitive edge, SABIC must solidify technological differentiation through continuous R&D investment, expand its sustainable product portfolio, and strengthen global partnerships to offer tailored solutions across diverse industries.

Keywords: Circular Economy; Plastics Recycling; SABIC; ESG; Chemical Recycling; Competitive Strategy

1. Introduction

This study aims to conduct a comparative analysis of the environmental recycling technologies and strategies of SABIC, BASF, and LG Chem to derive actionable insights to enhance SABIC's competitiveness. The main research methodology utilizes Porter's Five Forces, SWOT, and VRIO frameworks and includes an extensive literature review and case analysis. In addition, a qualitative research methodology was used to gain an in-depth understanding of each company's environmental recycling technology strategy.

2. Theoretical Framework

Global chemical companies' strategies on plastic circular economy and eco-friendly recycling technologies exhibit several commonalities while leveraging distinct approaches to achieve unique competitiveness. SABIC, BASF, and LG Chem all utilize recycling technologies and ESG strategies to establish a sustainable circular economy and solidify their positions in the eco-friendly market.

All three companies focus on advancing chemical recycling, mechanical recycling, and bio-based technologies to realize a circular economy. For instance, SABIC's TRUCIRCLE™ program accelerates the transition to a circular economy by converting plastic waste into high-value products. BASF's ChemCycling™ project transforms mixed waste into new chemical feedstocks through pyrolysis, while LG Chem employs supercritical pyrolysis processes to enhance the circularity of plastic resources. These initiatives contribute to the production of high-quality recycled materials and the reduction of carbon emissions.

3. Materials and Methods

The study employs Porter's Five Forces, SWOT, and VRIO analytical frameworks for systematic competitive analysis. Extensive literature review and case analysis were conducted for each company. A qualitative research methodology was utilized to gain in-depth understanding of each company's environmental recycling technology strategy. Primary data sources include company sustainability reports, academic literature, and industry publications.

4. Results

4.1 Differentiated Strategies of Each Company

Each company employs unique strengths to execute differentiated strategies. SABIC, for example, upcycles ocean-bound plastic waste into high-performance polybutylene terephthalate (PBT) through its LNP™ ELCRIN™ iQ PBT technology. This process maintains the same performance as traditional materials while significantly reducing the carbon footprint, serving as a key factor in reinforcing SABIC's competitive edge in the global market. BASF, on the other hand, expands the use of sustainable raw materials through its biomass balance approach, while LG Chem has commercialized PCR (Post-Consumer Recycled) technologies to recycle consumer waste into various products.

4.2 Competitive Analysis

Based on the VRIO framework analysis, SABIC's LNP™ ELCRIN™ iQ PBT technology demonstrates strong competitive advantage due to its scarcity and resistance to imitation. The SWOT analysis reveals that while all three companies are investing heavily in sustainable technologies, SABIC's ocean-bound plastic upcycling capability represents a distinctive market differentiator. Porter's Five Forces analysis indicates that the chemical recycling sector faces moderate competitive pressure, with high barriers to entry due to technological complexity and capital requirements.

5. Discussion

To maintain its competitive edge in this landscape, SABIC must adopt several strategic directions. First, it should solidify technological differentiation through continuous investment in R&D and large-scale commercialization projects. Unique recycling technologies, such as LNP™ ELCRIN™ iQ PBT, provide a strong competitive advantage due to their scarcity and resistance to imitation. Second, SABIC should expand its sustainable product portfolio by developing bio-based plastics and PCR materials. Third, it needs to strengthen global partnerships to offer tailored solutions across diverse industries, enabling entry into new growth markets. Furthermore, SABIC should accelerate its strategic expansion into emerging growth markets, such as electric vehicles (EVs), smart cities, and renewable energy.

6. Conclusion

By comparing the eco-friendly strategies of SABIC, BASF, and LG Chem, this study provides specific strategic directions for SABIC to maintain differentiated competitiveness, achieve sustainable growth, and establish a circular economy. The study demonstrates that SABIC's distinctive recycling technologies and ESG commitment position it well for leadership in the global sustainable materials market. Continuous investment in technology differentiation, portfolio expansion, and global partnerships will be critical to sustaining this competitive advantage. Future research could extend this analysis to additional chemical companies and emerging recycling technologies.