Asian Interdisciplinary and Sustainability Review

Original Research Article

Received: 14 September 2025 **Revised:** 9 October 2025 **Accepted:** 10 October 2025

OPERATIONALIZING THE BIO-CIRCULAR-GREEN MODEL: THE "BCG 3V STRATEGY" FOR SUSTAINABLE COMPETITIVENESS IN THE THAI COSMETICS INDUSTRY

Boonchai PANICHAKARN[1], Pisamai JARUJITTIPANT[1] and Pitak SIRIWONG[2]

1 Faculty of Business Administration, North Bangkok University, Thailand; boonchai.p@neocosmed.com (B. P.)

2 Faculty of Management Science, Silpakorn University, Thailand

Handling Editor:

Professor Dr.Ismail Suardi WEKKE Universitas Muhammadiyah Barru, Indonesia

(This article belongs to the Theme 1: Humanities and Social Sciences for Sustainability)

Reviewers:

1) Professor Dr.Shashi Kant GUPTA Lincoln University College, Malaysia

2) Associate Professor Police Lieutenant Colonel Dr.Tawit SUDSAKORN RPCA, Thailand

3) Police Captain Dr.Buppachat LIMPICHART Metrarath University, Thailand

Abstract

The Bio-Circular-Green (BCG) economy represents a pivotal national agenda for Thailand, yet a critical disconnect remains between policy ambition and practical implementation within the cosmetics manufacturing sector. This study addresses this gap by developing a strategic management framework tailored for industry adaptation. Employing a robust mixed-methods design, the research integrates Ethnographic Delphi Futures Research (EDFR) to synthesize expert consensus, followed by the Analytic Hierarchy Process (AHP) to prioritize key success factors hierarchically. The investigation identifies nine essential strategic components, with empirical results highlighting Cost Management and Proactive Leadership as the paramount drivers for successful BCG adoption. Synthesizing these priorities, the study introduces the "BCG 3V Strategy" framework—encompassing Vision, Value Chain, and Value Creation—as a novel mechanism to bridge the policy-practice divide. This framework provides a pragmatic roadmap for firms, particularly SMEs, to transition from cost-burdened compliance to value-driven sustainability through innovation alliances and smart manufacturing. The findings offer actionable insights for policymakers and managers, demonstrating how strategic alignment can transform environmental constraints into competitive advantages, thereby fostering resilience and sustainable growth in the global marketplace.

Keywords: Bio-Circular-Green Economy, Strategic Management Framework, Cosmetics Manufacturing Industry, Mixed-Methods Research, Sustainable Competitiveness

Citation Information: Panichakarn, B., Jarujittipant, P., & Siriwong, P. (2025). Operationalizing the Bio-Circular-Green Model: The "BCG 3V Strategy" for Sustainable Competitiveness in the Thai Cosmetics Industry. *Asian Interdisciplinary and Sustainability Review, 14*(2), Article 31. https://doi.org/10.14456/aisr.2025.42

Introduction

Running a business today requires the ability to adapt to rapidly changing environmental factors at both the macro and micro levels. In particular, strategic planning must align with national development policies and global trends (Amsa-ard, 2019). In Thailand, the government has established the Bio-Circular-Green Economy (BCG) Model as a national agenda, serving as a mechanism to drive sustainable, inclusive economic growth. This model not only aligns with the United Nations Sustainable Development Goals (SDGs) and the Sufficiency Economy Philosophy (SEP) but also plays an important role in enhancing the country's competitiveness. The goal is to overcome the middle-income trap and reduce social inequality. Development under the BCG Model focuses on leveraging the country's strengths in biodiversity and cultural diversity to create added value for products and services. The targeted industries include the health and medical sectors, as well as the cosmetics manufacturing industry, which demonstrates strong growth potential. However, to align the industry with the BCG approach, effective management strategies are essential (Lhasakul, 2023). These strategies must integrate the principles of the bioeconomy, circular economy, and green economy into business operations, covering raw material selection, production processes, marketing, and waste management. This presents a significant challenge for entrepreneurs who must adapt quickly to increasingly stringent environmental standards and regulations both domestically and internationally. Without clear strategies, businesses risk losing trade opportunities and diminishing their competitiveness in the global market (Somboonrattanachoke & Chaichinda, 2024).

Although the BCG economic model has been recognized as an important government policy, entrepreneurs still face many obstacles and challenges in practice. This is particularly evident under global economic conditions expected to grow slowly from 2024 to 2026, which directly affect the export sector (Maimun et al., 2023). Research by Sathaporncharoenying (2023) has also identified several limitations to applying the BCG concept in business operations. First, in terms of production, entrepreneurs face rising costs associated with eco-friendly raw materials and recyclable packaging (Mondello et al., 2024; Amrina et al., 2021; Omira et al., 2025). The absence of government tax incentives has made many of them hesitant to invest in changes to production processes. Second, in terms of marketing, entrepreneurs face price competition from imported goods, especially from China, where production costs are lower. In addition, the lack of internationally recognized eco-label standards causes confusion among consumers and makes it difficult to build trust in products. Third, in terms of finance, there are still no clear measures to promote investment in environmentally friendly product industries. As a result, entrepreneurs, particularly small businesses, lack access to the funding needed for research and development of innovations. There are also structural issues. Both government officials and the public still lack sufficient knowledge, understanding, and awareness of the BCG model's importance. These challenges reveal a gap between policy and practice that needs to be urgently addressed.

The global cosmetics industry is undergoing a profound transformation driven by a powerful convergence of conscious consumerism and stringent environmental regulations. This shift has created a burgeoning market for sustainable products, compelling businesses to move beyond traditional economic models and embrace sustainability as a core competitive advantage. In response, nations worldwide are developing strategic frameworks to guide this transition, with Thailand's Bio-Circular-Green (BCG) economic model serving as a prominent example of a national agenda designed to harness biodiversity and innovation for sustainable growth. However, a critical gap persists between this high-level policy ambition and its practical implementation at the firm level. While the BCG model provides a compelling vision, many entrepreneurs, particularly small and medium-sized enterprises (SMEs) that constitute the backbone of the cosmetics industry, lack a clear, validated, and actionable roadmap to translate

these principles into tangible business strategies. This knowledge gap is significant, as there is a scarcity of research that systematically develops and prioritizes the specific management strategies cosmetic manufacturers need to navigate the complexities of the BCG framework effectively. This study directly addresses this policy-practice gap by developing a strategic tool designed to empower Thai cosmetics firms to align their operations with the national agenda, thereby enhancing their competitiveness and promoting sustainable growth in a rapidly evolving global market.

When considering these issues in the Thai cosmetics manufacturing industry, which is the focus of this study, the challenges become even more complex. This industry plays a highly significant role in the national economy. In 2022, the export value reached 3,254.08 million US dollars, creating widespread employment (Department of International Trade Promotion, 2023). However, the industry comprises more than 3,903 companies, most of which are small and medium-sized enterprises (SMEs) with relatively low registered capital (Dataforthai, 2024). These businesses are particularly vulnerable to the problems mentioned earlier. They face rising production costs under the BCG concept while having limited bargaining power with suppliers and restricted access to financial resources (Pumchat et al., 2020). Price competition with international brands and low-cost imported products has also become a major obstacle to market expansion. Although global demand for natural and eco-friendly cosmetics continues to grow, offering a great opportunity for Thailand, which has an advantage in herbal raw materials (Department of International Trade Promotion, 2022), SMEs are unable to take full advantage of this opportunity. The main reasons are a lack of knowledge in developing products that meet international standards (Pereira et al., 2025; Bhat et al., 2025), the absence of marketing strategies to effectively reach green consumers (Todd, 2004), and limited capacity to manage risks associated with changing environmental regulations. Therefore, the operations of Thai cosmetics entrepreneurs are in a situation that requires significant adaptation to survive and grow within the BCG economic model (Chaiphawang, 2022).

From the problems and challenges described above, it is clear that the Thai cosmetics manufacturing industry is at a critical turning point. Although the industry has high potential and aligns with both national development directions and global trends, it still lacks clear strategic guidelines and tools to apply the BCG economic model in practice effectively. A review of the related literature shows that no previous research has systematically and comprehensively examined the components and development of management strategies for the Thai cosmetics manufacturing industry under the BCG framework (Perossa et al., 2023; Utama & Abirfatin, 2023). Most existing studies are descriptive in nature and lack integration of knowledge from multiple disciplines, including management, innovation, marketing, and environmental studies. This knowledge gap highlights the importance of the present research. The purpose of this study is to identify the key components and to develop suitable management strategies for the Thai cosmetics manufacturing industry. The expected outcome is a conceptual framework and a set of clear strategies that entrepreneurs, particularly SMEs, can apply in practice to enhance competitiveness, add value to products, and operate their businesses sustainably. At the same time, the findings will also benefit government agencies in formulating targeted and effective policies and support measures to drive the Thai cosmetics industry toward sustainable growth and global leadership under the BCG economic model. The research objectives are as follows: 1) To analyze the key components of strategies for managing the Thai cosmetics manufacturing industry under the BCG economic model. 2) To propose management strategies for the Thai cosmetics manufacturing industry under the BCG economic model.

Literature Review

BCG Economic Model

For strategies in managing Thailand's cosmetics manufacturing industry under the Bio-Circular-Green (BCG) economic model, the researcher reviewed the key ideas of the BCG approach as follows:

The BCG Model is a new economic framework that simultaneously integrates three economies: the bio economy, the circular economy (Mondello et al., 2024), and the green economy. Together, they aim to drive Thailand's progress in a more concrete, practical way. The BCG Model also aligns with the United Nations Sustainable Development Goals (SDGs) and follows the principles of the Sufficiency Economy Philosophy (SEP), which serves as a core guideline for Thailand's economic and social development.

Principles of the BCG Economic Model

The BCG Economic Model aims to enable Thailand to leverage its rich biodiversity and cultural diversity as key resources for national development. This approach is intended to strengthen the country's potential and ensure that people enjoy well-being, prosperity, and happiness inclusively. At the same time, it emphasizes the sustainability of natural resources under three main directions: 1) Guided by the Sufficiency Economy Philosophy, aiming for sustainable development, 2) Building strength from within while connecting Thailand to the global community, and 3) Moving forward together without leaving anyone behind.

The BCG Economic Model serves as a new mechanism for driving the country's economic growth, focusing on quality growth. It seeks to create a balance between a value-based economy, inclusive growth, and a circular society that makes efficient use of resources so they can be continuously replenished.

This study is anchored in an integrated theoretical framework that connects the macro-level policy of the Bio-Circular-Green (BCG) Economic Model with established micro-level management theories to create an actionable strategic roadmap. The BCG model serves as the primary framework for understanding the national sustainability agenda. However, to translate this policy into firm-level practice, the study draws upon the theory of Sustainability-Oriented Innovation (SOI) as the core conceptual bridge. SOI posits that achieving sustainability requires innovation across operational, organizational, and systemic levels, which directly aligns with the multifaceted challenges of implementing the BCG model. To facilitate this innovation, the concept of the Learning Organization proposed by Peter Senge is integrated as an essential enabling condition. It argues that only organizations capable of continuous learning, adaptation, and systems thinking can successfully embed complex new models such as the BCG model into their culture and processes. Finally, recognizing the practical constraints faced by SMEs, the framework incorporates the principles of Strategic Cost Management. This theory is crucial, as it reframes the relationship between sustainability and finance, asserting that innovation should not be viewed merely as a cost but as a strategic tool to enhance efficiency, reduce waste, and ultimately create a competitive advantage. Together, these four pillars form a cohesive framework. The BCG model sets the goal, SOI defines the path, the Learning Organization provides the capability, and Strategic Cost Management ensures viability, guiding the research from problem identification to the development of validated, practical strategies.

Research Methodology

A critical review of the existing literature reveals a significant gap concerning the practical application of the BCG economic model within the Thai cosmetics industry. While studies by authors such as Lhasakul (2023) and Sathaporncharoenying (2023) descriptively outline the challenges and obstacles, they often fall short of providing a synthesized, forward-looking strategic framework. Much of the current research consists of either broad policy analyses or

isolated case studies, lacking a comprehensive, expert-validated roadmap that integrates multiple business dimensions, from leadership to supply chain management. This gap highlights a key theoretical challenge. Traditional quantitative methods, which rely on historical data and established variables, are ill-suited for exploring a nascent, complex, and forward-looking topic such as BCG strategy development. Such methods fail to capture the nuanced, interdisciplinary insights required to build a truly actionable strategy from the ground up. Therefore, this study deliberately adopts the Ethnographic Delphi Futures Research (EDFR) methodology. This qualitative approach was selected for its unique ability to systematically gather, synthesize, and prioritize the tacit knowledge of diverse experts, allowing for the construction of a future-oriented strategic model where none currently exists. EDFR provides a rigorous framework for navigating uncertainty and complexity, making it the most appropriate theoretical foundation for addressing the identified knowledge gap and developing a practical tool for industry stakeholders.

For the study titled "Strategies for Managing the Thai Cosmetics Manufacturing Industry under the BCG Economic Model," the researcher conducted the research according to the following steps and procedures.

Participants

The key informants in this research included academics, entrepreneurs, specialists in the cosmetics manufacturing industry, and business partners (suppliers and customers).

The sample of key informants comprised representatives from the three groups who had at least five years of experience in strategy development, management, the BCG economic model, and the cosmetics manufacturing industry. In total, there were 19 informants, including five academics, eight entrepreneurs and industry specialists, and six business partners (suppliers and customers). The key informants were selected purposively for analysis using the Ethnographic Delphi Futures Research (EDFR) technique. The process involved interviews in the first round and questionnaires in the second round with all 19 informants. The researcher then selected those with direct experience from each group for the Analytic Hierarchy Process (AHP) assessment. This included two academics, three entrepreneurs, and industry specialists with the highest level of experience, as well as two business partners (suppliers and customers) with the highest level of experience, for a total of seven participants. The qualifications for the key informants required that representatives from all three groups have at least 5 years of expertise in strategy development, management, the BCG economic model, and the cosmetics manufacturing industry.

Research Instruments

Two sets of instruments were used in this study. The first questionnaire was designed to summarize expert opinions in the second round. This questionnaire was developed based on the results of the first-round interviews in order to confirm the selected components of strategies for managing the Thai cosmetics manufacturing industry under the BCG economic model. The second questionnaire was used for analysis with the Analytic Hierarchy Process (AHP), which was applied as part of the futures research process.

Data Processing and Data Analysis

To analyze the key components of strategies for managing the Thai cosmetics manufacturing industry under the BCG economic model, content analysis was conducted using the median and the interquartile range (Q3-Q1).

To analyze strategies for managing the Thai cosmetics manufacturing industry using the BCG economic model, the Analytic Hierarchy Process (AHP) was employed.

For the second round of EDFR, the statistics used were the median and the interquartile range (Q3-Q1). These were analyzed item by item to identify the most likely trends. The main and sub-trends that were likely to develop into components of strategies for managing the Thai

cosmetics manufacturing industry under the BCG economic model were considered at this stage based on expert opinions.

For the Analytic Hierarchy Process (AHP), the data were tested for consistency using the Consistency Ratio (CR) to assess the acceptability of the results. The CR should not exceed 10 percent (Janrungautai et al., 2025) for judgments involving more than five criteria, 9 percent for four criteria, and 5 percent for three criteria. If the CR exceeds the acceptable threshold, the comparisons must be revised and reanalyzed.

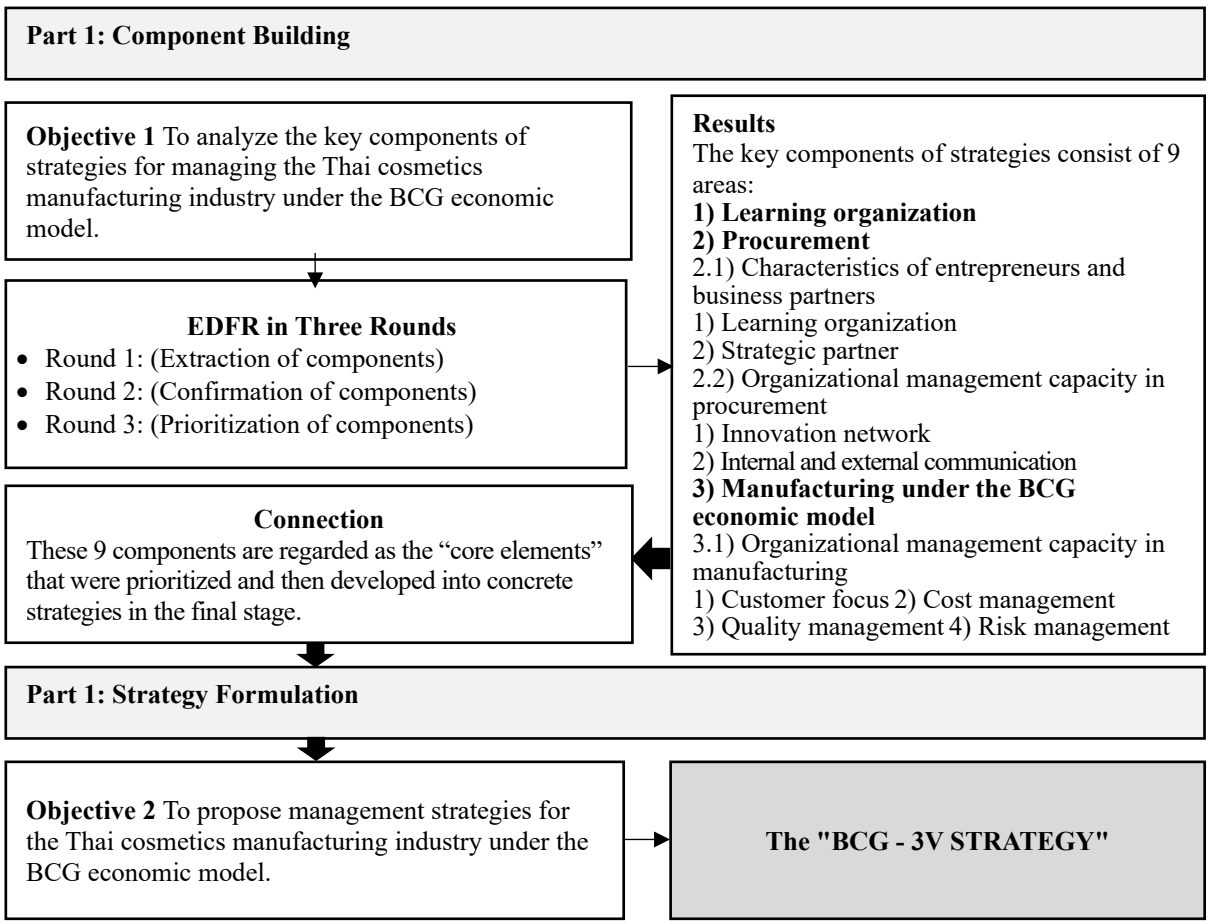

Figure 1 Research Methodology Framework

Research Results

Key Components of Strategies for Managing the Thai Cosmetics Manufacturing Industry under the BCG Economic Model

The study synthesized the key components of strategies through the futures research process (EDFR) involving 19 experts. The findings indicate that the most critical foundation is organizational and leadership characteristics. This begins with developing a learning organization that promotes knowledge of herbal resources (Bio Economy), waste management (Circular Economy), and the creation of a green culture (Green Economy). To achieve this, proactive leadership is essential, with leaders who have a clear vision for sourcing low-carbon raw materials and inspiring their teams. Both elements must be driven by effective communication, which helps build understanding of the BCG concept at every level, from farmers to business partners, and embed it into the company's goals. The next component is procurement and ecosystem management, which emphasizes collaboration across sectors. A crucial aspect of this is forming strategic partnerships with partners who share sustainability goals, ranging from working with herbal-growing communities (Bio Economy) to co-

developing recyclable packaging (Circular Economy). In addition, innovation networks should be strengthened through collaboration with research institutes and professional associations to gain access to new technologies and knowledge vital to improving product formulations and enhancing eco-friendly production processes. For the manufacturing process, four main management capabilities are required. The first is customer focus, which ensures that products meet consumer demand for safety and environmentally friendly packaging. This must be accompanied by cost management, identified by experts as the top priority, emphasizing revenue generation from waste and the use of renewable energy. At the same time, quality management is essential to ensure traceability, while risk management is necessary to address the impacts of climate change and increasingly stringent environmental regulations.

Table 1 Summary of weights and priority ranking of strategic components for the management of the Thai cosmetics manufacturing industry under the Bio-Circular-Green (BCG) economic model.

	Decision Criteria								
Strategy Components	**LO**	**PL**	**SP**	**IN**	**IEC**	**CF**	**CM**	**QM**	**RM**
Importance Weight	0.11	0.15	0.12	0.07	0.07	0.11	0.17	0.12	0.07

Note: LO: Learning Organization; PL: Proactive Leadership; SP: Strategic Partnership; IN: Innovation Network; IEC: Internal and External Communication; CF: Customer Focus; CM: Cost Management; QM: Quality Management; RM: Risk Management

The final results of the Analytic Hierarchy Process (AHP), summarized in Table 1, provide a clear classification and prioritization of the strategic components for managing the Thai cosmetics manufacturing industry under the BCG economic model. The strategies can be grouped as follows.

Core Strategies: This group comprises the strategic components with the highest priority weights and should serve as the central pillar of initial development efforts. They are ranked as follows: first, Cost Management (CM) with a weight of 0.17; and second, Proactive Leadership (PL) with a weight of 0.15.

Supporting Strategies: This group comprises secondary components that reinforce the core strategies. It includes the following: third, Strategic Partnership (SP) and Quality Management (QM), each with a weight of 0.12; and fifth, Learning Organization (LO) and Customer Focus (CF), also with a weight of 0.11.

Foundational Strategies: This group consists of fundamental components that sustain and complete the overall strategic ecosystem. Although these components have the lowest weights, they remain essential. This group includes the following: seventh, Innovation Network (IN), Internal and External Communication (IEC), and Risk Management (RM), all sharing an equal weight of 0.07.

In summary, the clearest path for strategic development is to focus on effective cost control and management, coupled with fostering visionary and adaptive leadership—the key supporting strategies center on quality, partnerships, organizational development, and customer orientation.

Strategy Proposal for Managing the Thai Cosmetics Manufacturing Industry under the BCG Economic Model

Based on the synthesis of research findings, a set of strategies for managing the Thai cosmetics manufacturing industry under the BCG economic model was developed and named “BCG 3V Strategy.” This strategy reflects three core principles: coverage of the entire value chain, creation of new sustainable value, and leadership driven by vision. It was designed to address the problems and challenges currently faced by the industry, including shifting consumer

demand toward sustainable products, intensified competition, and increasing pressure from new regulations.

The strategies consist of five interconnected directions. The first strategy is leadership in driving the learning organization toward sustainability. This focuses on creating an organizational culture that is flexible and ready for change, with leaders guiding the direction and embedding the BCG concept into the organization. This strategy relies on two key mechanisms, proactive leadership and the development of a learning organization, to continuously advance sustainability innovation. The second strategy is building innovation alliances for a green supply chain. The goal is to develop a supply chain that is sustainable and transparent from upstream to midstream. The emphasis is on creating strong collaboration with business partners, farmers, and research institutes through projects such as the “BCG Partner Program” and the “Sustainable Herbal Community” initiative. These efforts aim to secure environmentally friendly raw materials and foster innovations. Strategic partnerships and innovation networks support this strategy.

The core of the BCG 3V Strategy is the third strategy, which focuses on upgrading smart manufacturing processes to reduce costs and waste (Widyanty et al., 2025). This strategy is designed to ensure that the BCG concept delivers tangible economic benefits and directly aligns with the AHP analysis, in which experts ranked cost management as the highest priority. The main goal is to improve production processes to achieve maximum efficiency by reducing production costs, minimizing waste to zero, and lowering energy consumption. Concrete actions under this strategy include the “Zero Waste Production” project, which applies LEAN or Kaizen principles in practice, the “Circular Economy in Factories” project that invests in technologies to reuse waste, such as wastewater treatment for recycling, and the “Clean Energy” project through the installation of solar cell systems and upgrading machinery to more energy-efficient models. For this strategy to succeed, three key supporting mechanisms are required: prioritizing cost management, a strong quality management system to minimize waste from repeated work, and Openness and a willingness to invest in modern production technologies and automation systems.

To ensure that all strategies lead to real business outcomes, there must be strategies that connect internal operations to the external market while managing risk. The fourth strategy is communicating BCG values to build engagement with target customers. The goal is to raise awareness and understanding of the value of products developed under the BCG concept, while also differentiating and gaining a competitive advantage through brand storytelling that highlights social and environmental responsibility. Key actions include the digital marketing campaign “From Farm to Skin Stories,” the “Return Packaging” initiative that engages customers in the circular economy, and the use of a “QR Code Traceability System” to promote transparency and credibility. Finally, the fifth strategy is proactive management for legal compliance and business continuity. This strategy focuses on building an effective risk management system that enables timely adaptation and compliance with new environmental laws and regulations. Key measures include establishing a “Legal Watch Unit,” conducting comprehensive risk assessments that integrate environmental and social dimensions, and ensuring supply chain continuity through multi-sourcing of raw materials to reduce dependency and diversify risk. This strategy is directly supported by risk management, which is a crucial factor in achieving long-term business sustainability.

Conclusion and Discussion

This research aimed to examine the industry's current problems, synthesize the key strategic components, and propose appropriate management approaches. The findings indicate that the Thai cosmetics manufacturing industry is facing complex structural challenges that are interconnected across multiple dimensions, which existing strategic plans have been unable to

address effectively. To overcome these limitations, this study employed the Ethnographic Delphi Futures Research (EDFR) method to collect in-depth insights from 19 experts and, with 7 of them, applied the Analytic Hierarchy Process (AHP) to prioritize the identified components. The outcome is the development of a new set of strategies titled "BCG 3V Strategy." This framework integrates the concepts of the bio economy, circular economy, and green economy into systematic business management to respond to growing pressures from markets, regulations, and competition. The strategies proposed in this study are not merely theoretical concepts but the results of synthesis and validation by experienced industry practitioners. They are designed to serve as practical tools for entrepreneurs to enhance competitiveness and drive their businesses toward sustainability, in alignment with the national agenda and global development trends.

Regarding Research Objective 1, which aimed to identify the key strategic components through the EDFR and AHP processes, it was found that nine essential components drive the cosmetics industry under the BCG concept. These are the learning organization, proactive leadership, strategic partnerships, innovation networks, internal and external communication, customer focus, cost management, quality management, and risk management. The prioritization analysis using the AHP technique revealed that experts considered cost management to be the most important component (weight 0.17), followed by proactive leadership (0.15), and then strategic partnerships and quality management (0.12) (Campos et al., 2025). This result reflects the practical perspective of experts that making the BCG model truly feasible must begin with managing costs as efficiently as possible. The findings are consistent with several key theoretical perspectives. The emphasis on the learning organization aligns with Senge's (1990) ideas, which propose that organizations capable of continuously developing their capacity through five disciplines are more likely to achieve their goals—especially in today's rapidly changing environment. Similarly, the high ranking of proactive leadership corresponds with Covey's (2004) concept, which identifies four essential characteristics of proactive leaders: self-awareness, imagination, conscience, and independent will. These qualities are necessary for guiding organizations through change and establishing a path toward sustainable futures. The prioritization of cost management also aligns with the concept of strategic cost management by Yaşar (2010), which emphasizes managing costs to achieve maximum efficiency and effectiveness, thereby creating a competitive advantage. Therefore, the components identified in this study are not simply a checklist but rather a strategic framework that balances the creation of strong organizational foundations (leadership and learning) with excellence in management (cost and quality). This balance has been validated both theoretically and through expert consensus.

For the results under Research Objective 2, the study proposed the "BCG 3V Strategy." This strategy was synthesized from the components that had already been reviewed and prioritized. It consists of five interconnected strategies: 1) leadership in driving the learning organization toward sustainability, 2) building innovation alliances for a green supply chain (Mondello et al., 2024; Amrina et al., 2021), 3) upgrading smart manufacturing processes to reduce costs and waste, 4) communicating BCG values to build engagement with target customers, and 5) proactive management for legal compliance and business continuity. The structure of these five strategies closely aligns with the concept of sustainability-oriented innovation (SOI) proposed by Adams et al. (2008), which classifies SOI development into three levels: operational, organizational, and systemic. Strategy 3, which emphasizes upgrading smart manufacturing processes, corresponds to an operational optimization level that focuses on improving efficiency and reducing negative impacts within the organization. Strategies 1 and 4 reflect the level of organizational transformation, which involves cultural and business model changes to create shared value. Strategies 2 and 5 demonstrate characteristics of systems building, which involves collaboration among multiple sectors to create an ecosystem that supports

sustainability on a broader scale. In addition, Strategy 2, which emphasizes building innovation alliances, is directly consistent with the work of Aslam et al. (2020) on Industry 5.0. Their study identifies value network integration as one of the key drivers of sustainable manufacturing (Bhat et al., 2025), reinforcing the importance of collaboration throughout the supply chain as a central factor in achieving sustainability transformation in the current era. Therefore, the proposed BCG 3V Strategy is not merely a set of isolated activities but an integrated framework grounded in theoretical foundations. It has the potential to guide organizations through systematic transformation, starting from internal improvements to generating broader systemic impacts (Manoppong et al., 2024).

While this study is centered on the Thai context, its findings and the proposed “BCG 3V Strategy” are highly relevant to other Asian nations navigating a similar transition toward a green economy. Many economies in the region, such as Indonesia and Vietnam, share a comparable industrial structure dominated by SMEs and face common challenges in implementing national sustainability policies. These challenges include limited access to capital for green technology, fragmented supply chains for natural raw materials, and the difficulty SMEs face in meeting stringent international environmental standards. Conversely, the opportunities are also parallel. Just as Thailand leverages its rich herbal biodiversity, Indonesia and Malaysia are capitalizing on their natural resources to tap into the burgeoning Halal cosmetics market. The global success of South Korea's "K-Beauty," driven by intense innovation and branding, serves as a benchmark that illustrates the potential rewards the Thai BCG model aims to unlock. Therefore, the strategic priorities identified in this research, particularly the critical balance between proactive leadership and pragmatic cost management, are likely resonant across the Asian cosmetic sector. The “BCG 3V Strategy” can thus be viewed not as a rigid Thai-specific solution, but as an adaptable framework that other Asian countries could tailor to their unique cultural and economic contexts to bridge their own "policy-practice gaps."

In summary, this research highlights the complex and interconnected challenges facing the Thai cosmetics manufacturing industry, which existing strategic plans cannot address effectively. By applying the systematic and reliable processes of futures research (EDFR) and the Analytic Hierarchy Process (AHP), the study identified nine key components. It ranked their importance based on expert evaluation. Cost management was identified as the most critical practical factor, leading to the development of the BCG 3V Strategy. This framework comprises five major strategies: organizational culture, supply chain management, production efficiency, marketing communication, and risk management. The main contribution of this study is to bridge the macro-level policy concept of the BCG economic model with actionable practices at the organizational level. The result is a clear and validated strategic framework supported by industry stakeholders. The proposed strategies not only enable entrepreneurs, especially SMEs, to adapt and respond effectively to changing challenges but also enhance the competitiveness of the Thai cosmetics industry in the global market, where sustainability is increasingly valued. Furthermore, the strategies align with the United Nations Sustainable Development Goals (SDGs) and support government policies aimed at advancing the country through the bioeconomy, circular economy, and green economy (Utama & Abirfatin, 2023). Therefore, this research fills an important knowledge gap and provides practical value to the Thai cosmetics industry as it moves toward balanced, sustainable growth.

While the formulation of the “BCG 3V Strategy” provides a robust theoretical framework, its successful translation into tangible business outcomes depends critically on implementation, a phase fraught with practical challenges, especially for SMEs that dominate the Thai cosmetics industry. The high priority assigned to proactive leadership in the AHP analysis underscores the point that effective implementation is not a passive process but requires active, visionary guidance to navigate organizational inertia and allocate scarce resources. SMEs often operate

with limited financial and human capital, making large-scale investments in smart manufacturing or comprehensive green supply chains a significant challenge. Furthermore, transitioning from established practices to new, sustainable processes can encounter resistance from employees who may perceive the changes as disruptive or lacking immediate benefit. This challenge aligns with the findings of Widyanty et al. (2025), who emphasize that fostering Green Innovative Work Behaviour through empowerment and targeted green human resource management practices is essential for securing employee buy-in and ensuring that sustainability goals are adopted at the operational level, rather than being mandated only from the top. Similarly, the successful execution of strategies involving new technologies depends on building digital trust within the organization, as Strazzullo (2024) highlights. Without such trust, technology adoption can falter, resulting in inefficient implementation and wasted investment. Therefore, the implementation of the BCG 3V Strategy should not be viewed as a linear, top-down directive but rather as a dynamic, iterative process. This approach requires creating feedback loops, establishing clear performance metrics to track progress in cost reduction and quality management, and fostering continuous dialogue among all stakeholders, as Amrina et al. (2021) echo in their model of open innovation communities. Ultimately, the successful application of this research lies in a pragmatic implementation plan that balances strategic vision with operational realities, addresses human factors through trust and empowerment, and promotes collaboration across the entire value chain.

The finding that “cost management” is the highest-priority strategic component (weight 0.17), while the core principle of the BCG model is to use innovation to create value, may appear to present a practical contradiction, particularly for SMEs with capital constraints. However, this research proposes that the conflict can be resolved by shifting the perception of innovation from being seen as an “expense” to being recognized as a long-term tool for cost reduction and efficiency enhancement." The third strategy presented in this study, "Upgrading smart manufacturing processes to reduce costs and waste," serves as a clear example. Innovation in this context does not necessarily entail high-cost research and development for new products. However, it encompasses process innovation, such as applying LEAN or Kaizen principles in a "Zero Waste Production" project, investing in technology for waste recycling in a "Circular Economy in Factories" project, or installing clean energy systems, such as solar cells, to reduce energy expenses. While these innovations require an initial investment, they directly result in lower raw material and energy costs, reduced waste disposal, and an overall increase in production efficiency, which aligns perfectly with the primary goal of cost management. Therefore, resolving this conflict is not a matter of choosing between innovation and cost control, but rather of strategically selecting "cost-driven innovation" to ensure sustainable development is genuinely achieved while simultaneously building a competitive advantage.

The BCG 3V Strategy, whose foundation lies in the 3V, comprises nine subcomponents developed in this study. These are organized into the BCG-3V Strategy as follows: 1) Vision: Leadership-driven vision. This group relates to the foundation and direction of the organization, shaped by leadership and organizational culture. It includes proactive leadership and the organizational characteristic of being a learning organization (Widyanty et al., 2025; Strazzullo, 2024). 2) Value Chain: Strategies that encompass the entire value chain. This group emphasizes building relationships and cooperation across various sectors of the supply chain to create a sustainable ecosystem. It includes strategic partnerships, innovation networks, and internal and external communication. Moreover, 3) Value Creation: Creating new and sustainable value for business and society. This group focuses on internal processes that directly generate value for products, services, and the organization, thereby benefiting customers and business performance. It includes customer focus, cost management, quality management, and risk management (Amrina et al., 2021).

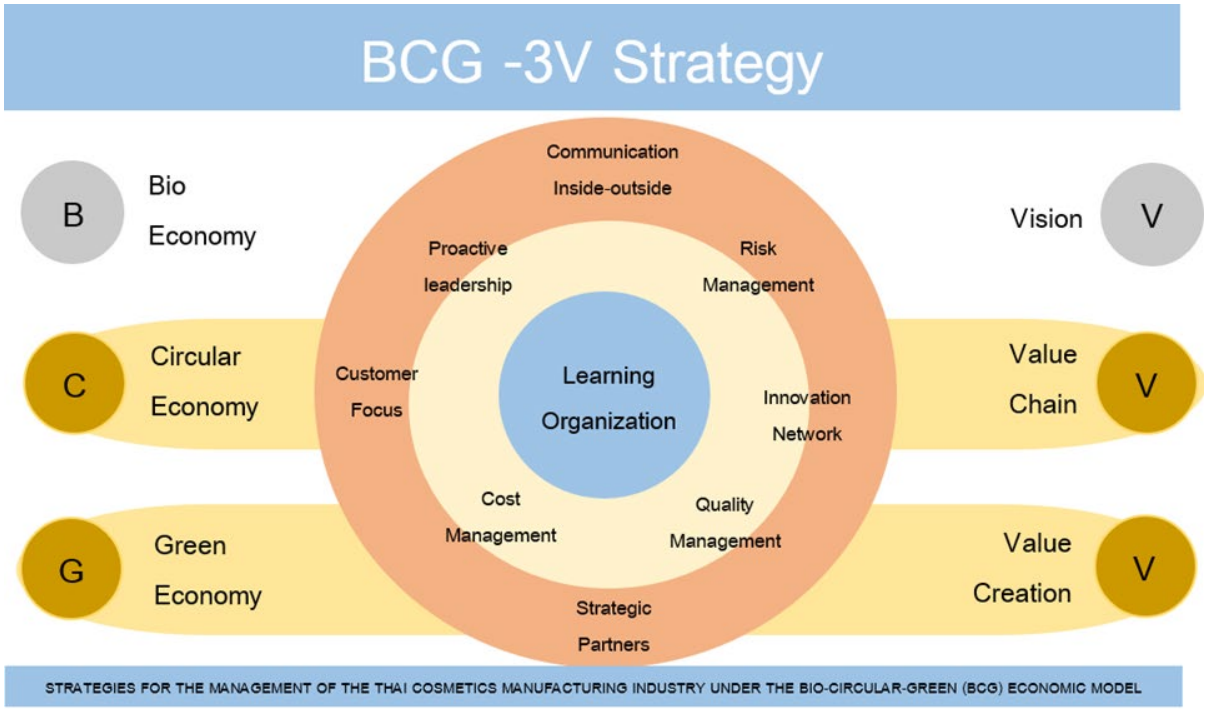

Figure 2 BCG 3V Strategy

Recommendations

Based on the research findings, this study proposes a phased strategic roadmap applicable for policy formulation, practical business implementation, and future academic inquiry. In the short term (6-12 months), the priority for entrepreneurs, particularly SMEs, is to implement Operational Adjustments focused on internal process improvements to reduce costs and establish a solid foundation. This immediate phase requires the rigorous application of LEAN manufacturing principles to eliminate waste ("Zero-Waste Manufacturing") and to enhance quality management systems to minimize rework, thereby achieving tangible cost reductions. Concurrently, firms should consider investing in clean technologies with rapid returns, such as installing solar cell systems, to alleviate long-term electricity expenses. Beyond production, marketing strategies must be adjusted immediately to communicate BCG values; this can be achieved by launching digital campaigns like “From Farm to Skin Stories” or implementing “QR Code Traceability Systems” to build awareness and trust among target consumers without waiting for full production optimization.

Moving into the mid-term (1-3 years), businesses should transition toward Systemic Adjustments to support the sustainable implementation of the BCG concept. This stage requires scaling up from operational fixes to creating a comprehensive framework through strategic planning and collaboration. Key to this is establishing a "Green Supply Chain Ecosystem" by developing a “BCG Partner Program” with evaluation criteria to select suppliers aligned with sustainability goals, while simultaneously building innovation networks with research institutes to access new technologies. Crucially, proactive leadership is essential to embed the BCG concept into the organizational management system; leaders must integrate BCG vision and goals into Key Performance Indicators (KPIs) for all employees and establish a “Legal Watch Unit” to monitor environmental regulations. To ensure accountability, firms should develop a performance measurement system using clear quantitative indicators—such as waste-reduction rates and energy costs per production unit—to evaluate the success of the BCG-3V Strategy implementation.

Finally, long-term transformation (3-5 years) requires Structural Adjustments, driven by industry-wide collaboration and government policy support, to address challenges beyond the

capacity of individual entrepreneurs. On the policy front, government agencies should provide clear financial incentives, such as tax breaks and investment promotion measures, to support entrepreneurs in upgrading machinery aligned with the BCG model. Furthermore, promoting a national "Green Label" or "BCG Label" for Thai cosmetics is vital to achieve international recognition and resolve consumer confusion. In parallel, the Thai Cosmetic Industry Association should establish a centralized platform to serve as a hub for BCG-related knowledge and facilitate business matching between SMEs, green raw material suppliers, and researchers. Additionally, supporting in-depth research into the behavior of Thai "Green Consumers" is essential, as it will enable entrepreneurs to develop precise marketing strategies that meet market demands and secure a long-term competitive advantage.

References

Adams, R., Neely, A., Yaghi, B., & Bessant, J. (2008). *Proposal for measures of firm-level innovation performance in 12 sectors of UK industry* (Working Paper: September 2008). United Kingdom: National Endowment for Science, Technology and the Arts.

Amrina, U., Hidayatno, A., & Zagloel, T. (2021). A model-based strategy for developing sustainable cosmetics small and medium industries with system dynamics. *Journal of Open Innovation: Technology, Market, and Complexity, 7*(4), 225.

Amsa-ard, P. (2019). *The Model of Strategic Change Capability for Development Small and Medium Enterprises (SMEs) in Thailand to Sustainability*. Doctor of Philosophy Thesis, Silpakorn University.

Aslam, F., Aimin, W., Li, M., & Ur Rehman, K. (2020). Innovation in the Era of IoT and Industry 5.0: Absolute Innovation Management (AIM) Framework. *Information,* 11(2), 124.

Bhat, M., Radu, T., Martín-Fabiani, I., Kolokathis, P., Papadiamantis, A., Wagner, S., ... & Velimirovic, M. (2025). Safe and sustainable by design of next generation chemicals and materials: SSbD4CheM project innovations in the textiles, cosmetic and automotive sectors. *Computational and Structural Biotechnology Journal, 29*, 60-71.

Campos, N., de los Ángeles Cortés, M., Pippo, T., Rius, J., Fitzgerald, J., & Couve, A. (2025). Multiple factors shape technology transfer for the development and manufacture of vaccines in Latin America and the Caribbean. *Biologicals: Journal of the International Association of Biological Standardization, 90*, 101826.

Chaiphawang, K. (2022). The relationship between business resources, competitive advantage strategies and implementation of the BCG economic model of community enterprises in Chiang Rai Province. *Journal of Buddhist Anthropology, 7*(12), 1091-1106.

Covey, S. (2004). *The 7 habits of highly effective people*. New York: Free Press.

Dataforthai. (2024). *List of entrepreneurs in the business group of manufacturing perfumes and cosmetics*. Retrieved from www.dataforthai.com/business/objective/20232/10.

Department of International Trade Promotion. (2022). *Marketing report from Tokyo April 2022*. Nonthaburi: Department of International Trade Promotion.

Department of International Trade Promotion. (2023). *Statistics of cosmetic product exports*. Nonthaburi: Department of International Trade Promotion.

Janrungautai, J., Jarujittipant, P., & Siriwong, P. (2025). Building Resilient Green Value Chain: A Hierarchical Model for Thai Food Industry Sustainable Transformation. *Journal of Community Development Research (Humanities and Social Sciences), 18*(3), 22-37.

Lhasakul, O. (2023). BCG Economy E-San Model Sustainable economy and innovation. *Journal for Developing the Social and Community, 10*(2), 601-618.

Maimun, T., Thongmark, C., Rattanatai, B., & Rojanadilok, T. (2023). BCG Economic Model for Balanced and Sustainable Development. *EAU Heritage Journal Social Science and Humanities, 13*(2), 14-27.

Manoppong, N., Khotradha, D., & Fongissara, N. (2024). Management of Fashion and Lifestyle Branding and Business Policy Green and Creative Product Prototype. *Joural of Home Economic, 67*(1), 138-157.

Mondello, A., Salomone, R., & Mondello, G. (2024). Exploring circular economy in the cosmetic industry: Insights from a literature review. *Environmental Impact Assessment Review, 105*, 107443.

Omira, A., Grira, S., Mourad, A., & Alkhedher, M. (2025). The new generation of cosmetics packaging: A paradigm shift. *Global Transitions, 7*, 223-246.

Pereira, A., Abdel-Aty, T., Negri, E., Rocca, R., & Fumagalli, L. (2025). Low-Cost Life Cycle Assessment Performance in Manufacturing Companies: A Guide Based on Data Collection Methodology. *IFAC PapersOnLine, 59*(10), 1161-1166.

Perossa, D., Acerbi, F., Rocca, R., Fumagalli, L., & Taisch, M. (2023). Twin Transition cosmetic roadmapping tool for supporting cosmetics manufacturing. *Cleaner Environmental Systems, 11*, 100145.

Pumchat, N., Fuangchan, S., Raktham, A., & Chirinang, P. (2020). The Government Role in Thai Cosmetic Industry Potential Development. *Ph.D. in Social Sciences Journal, 10*(3), 650-662.

Sathaporncharoenying, U. (2023). Enhancing the Development of the Cosmetics Industries with the BCG Economic Model: A Study of Problem and Propose Policy Development for the Thai Cosmetics Industries Containing Herbal Ingredients. *Thai Food and Drug Journal, 30*(3), 16-38.

Senge, P. (1990). The Leader's New Work: Building learning organization. *Sloan Management Review, 32*, 7-23.

Somboonrattanachoke, T., & Chaichinda, C. (2024). Application of the BCG Model to the Hotel Service Business to Sustainably Encourage Tourism in the New Normal Era. *Sripatum Chonburi Interdisciplinary Journal (Online), 10*(1), 17-31.

Strazzullo, S. (2024). Fostering digital trust in manufacturing companies: Exploring the impact of Industry 4.0 technologies. *Journal of Innovation & Knowledge, 9*(4), 100621.

Todd, A. (2004). The aesthetic turn in green marketing: Environmental consumer ethics of natural personal care products ethics of natural personal care products. *Ethics and the Environment, 2004*, 86-102.

Utama, D., & Abirfatin, M. (2023). Sustainable lean six-sigma: A new framework for improve sustainable manufacturing performance. *Cleaner Engineering and Technology, 17*, 100700.

Widyanty, W., Oktasari, D., Riyanto, S., Nusraningrum, D., Damayanti, S., Bakti, I., ... & Yaman, A. (2025). Green innovative work behaviour model on Generation Z employees in the manufacturing industry: An empirical evidence from Indonesia. *Sustainable Futures, 9*, 100765.

Yaşar, F. (2010). Competitive strategies and firm performance Case Study on Gaziantep carpeting sector. *Mustafa Kemal University Journal of Social Sciences Institute, 7*(14), 309-324.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.