The Application of the BCG Model and Competitive Strategies to Achieve Sustainable Development Goals in the Health and Beauty Supplement OEM Industry in Samut Sakhon Province

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Abstract

This research aims to examine the level of application of the BCG Economic Model and to analyze the causal relationships between BCG Model implementation and the achievement of Sustainable Development Goals (SDGs), with competitive strategies serving as a mediating variable among Original Equipment Manufacturer (OEM) operators in the health and beauty supplement industry in Samut Sakhon Province, Thailand. The study sample consisted of OEM operators, and data were collected using a structured questionnaire. The results indicate that OEM operators apply the BCG Model comprising the Bioeconomy, Circular Economy, and Green Economy at a high level. In terms of competitive strategies, operators place the greatest emphasis on brand credibility and compliance with international manufacturing standards, such as Good Manufacturing Practice (GMP) and Hazard Analysis and Critical Control Points (HACCP). This is followed by niche market penetration and quality differentiation strategies. These competitive strategies contribute to a high level of SDG achievement, particularly in relation to Good Health and Well-being (SDG 3), Decent Work and Economic Growth (SDG 8), and Responsible Consumption and Production (SDG 12). Path analysis reveals that the application of the BCG Model has a direct influence on the adoption of competitive strategies (new value) and a direct influence on SDG achievement. Additionally, competitive strategies have a direct effect on the achievement of SDGs. Overall, the application of the BCG Model exerts both direct and indirect effects on SDG achievement through competitive strategies, resulting in a significant total effect.

Keywords: BCG Model, Competitive Strategy, Health and Beauty Supplement OEM Industry, Sustainable Development Goals (SDGs)

Introduction

In recent years, Thailand, along with many countries worldwide, has faced the dual challenge of achieving economic growth while conserving natural resources and mitigating environmental impacts (Wei et al., 2020). This situation has driven a shift toward sustainable economic development frameworks, most notably the BCG Economic Model, which integrates the Bioeconomy, Circular Economy, and Green Economy (Worapongpat, 2020). The BCG Model is closely aligned with Thailand's 20-Year National Strategy and the United Nations Sustainable Development Goals (SDGs), emphasizing value creation from biological resources, efficient resource utilization, and the adoption of clean and environmentally friendly technologies (United Nations; Department of Industrial Promotion [DIP]; Worapongpat, 2021a).

The health and beauty supplement Original Equipment Manufacturer (OEM) industry represents a significant sector within Thailand's manufacturing landscape, supported by an extensive network of factories serving both domestic and international markets (Worapongpat, 2021b). Despite its growth potential, OEM operators continue to face several structural constraints, including limited strategic management capabilities, challenges in integrating BCG principles with advanced production technologies, and insufficient understanding of the linkages between the BCG Model, competitive strategies, and SDG achievement (Worapongpat, 2021b). Moreover, a study conducted by the Samut Sakhon Provincial Industry Office revealed that many operators lack clear strategic frameworks for leveraging BCG principles to enhance competitive advantages, such as cost management, production standardization, quality differentiation, and niche market targeting (Worapongpat, 2023a). These limitations hinder the industry's ability to achieve long-term competitiveness and sustainability (Worapongpat, 2023c).

The health and beauty supplement industry has emerged as a high-growth sector both domestically and globally. In Thailand, the market value exceeded THB 24 billion in 2023 and is projected to grow at an average annual rate of approximately 8 percent. This expansion coincides with rising consumer demand for health-oriented and environmentally responsible products, consistent with the principles of the BCG economic framework and sustainable bio-resource utilization (Worapongpat, 2023d). As a result, the BCG Model has been elevated to the status of a national economic strategy aimed at driving sustainable growth and enhancing global competitiveness. However, prior studies indicate that although many industries demonstrate responsiveness toward BCG adoption, significant strategic gaps remain—particularly in the areas of competitive strategy formulation, innovation capability, and alignment with SDG objectives (Worapongpat, 2023e; Worapongpat, 2023f).

Samut Sakhon Province serves as a key industrial hub in Thailand, traditionally known for processed seafood manufacturing but increasingly transitioning toward the health and beauty supplement OEM industry (Worapongpat, 2023g). The province benefits from a high concentration of factories certified under international standards such as Good Manufacturing Practice (GMP) and Hazard Analysis and Critical Control Points (HACCP), as well as a ready labor force and well-established export networks (Worapongpat, 2024a). Nevertheless, a persistent challenge remains in the systematic integration of the BCG Model into competitive strategies among OEM operators (Worapongpat, 2024b). This shortcoming is particularly evident in areas such as quality differentiation, environmentally friendly product development, and niche market penetration (Worapongpat, 2024c). Furthermore, the linkage between OEM operations and SDGs related to health, employment, and sustainable production remains limited (Worapongpat & Chaoluang, 2024). Consequently, Samut Sakhon, as an "industrial city," has yet to fully capitalize on its OEM potential to serve as a model for sustainable industrial development (Worapongpat & Uttamavangso, 2024).

In response to these challenges, this research aims to investigate the application of the BCG Model and the implementation of competitive strategies within the health and beauty supplement OEM industry in Samut Sakhon Province. The specific objectives are: (1) to examine the level of BCG Model application and competitive strategy adoption among OEM operators; (2) to analyze the path relationships between the BCG Model, competitive strategies, and the achievement of SDGs; and (3) to propose strategic guidelines for enhancing the sustainable competitiveness of the OEM industry. This study adopts a quantitative research approach, collecting data from OEM operators in Samut Sakhon Province and employing path analysis for data interpretation. The findings are expected to contribute academically by addressing existing research gaps and practically by supporting policy formulation and sustainable industrial development in Samut Sakhon Province.

Objectives

1. To assess the level of BCG Model application, competitive advantage strategies, and SDG achievement among health and beauty supplement OEM operators in Samut Sakhon Province.
2. To examine the causal path relationships between BCG Model application, competitive advantage strategies, and SDG achievement among health and beauty supplement OEM operators in Samut Sakhon Province.

Literature Review

1. Research and Concepts on the BCG Model and Sustainable Development

The BCG Model (Bio–Circular–Green Economy) has been widely adopted as a key framework for driving Thailand's new economic development paradigm (Worapongpat, Limlertrid, Zangphukieo, Wongkumchai, & Muangmee, 2023). The model emphasizes value creation from biological resources (Bioeconomy), efficient resource circulation and waste reduction (Circular Economy), and environmentally friendly production and consumption practices (Green Economy). Empirical evidence suggests that the application of the BCG Model significantly enhances organizational competitiveness, particularly among small and medium-sized enterprises (SMEs) in the agricultural and food sectors (Worapongpat, 2025a). In addition, operations aligned with BCG principles have been shown to contribute substantially to the achievement of Sustainable Development Goals (SDGs), especially in environmental protection and economic sustainability dimensions (Worapongpat, 2025b). Despite the growing body of literature on BCG implementation, studies specifically examining the health and beauty supplement Original Equipment Manufacturer (OEM) industry at the provincial or local level remain limited. This lack of industry- and location-specific research represents a critical knowledge gap, particularly in understanding how BCG principles translate into operational strategies and sustainable outcomes within the OEM context (Worapongpat, 2025c).

2. Research Related to Competitive Strategies in the OEM Industry

Competitive strategy theory posits that firms can achieve sustainable competitive advantage through three generic strategies: cost leadership, differentiation, and focus or niche market penetration (Porter, as cited in Worapongpat, 2025d). Prior research indicates that OEM operators adopting differentiation strategies based on product innovation, quality enhancement, and value-added services are more likely to increase export performance and long-term competitiveness (Worapongpat, 2025d). Conversely, studies on the Thai beauty industry reveal that intense competition has led to the widespread adoption of co-branding and partnership strategies with brand owners, requiring OEM manufacturers to elevate production standards

and comply with international certifications such as Good Manufacturing Practice (GMP) and Hazard Analysis and Critical Control Points (HACCP) to build market trust and credibility (Worapongpat, 2025e).Furthermore, the literature emphasizes that OEM firms must move beyond a traditional contract manufacturing role by integrating strategic management, environmental responsibility, and brand-supporting capabilities to sustain growth in highly competitive markets (Worapongpat, 2025f). These findings highlight the importance of competitive strategies as a mediating mechanism through which broader economic models, such as the BCG framework, can be translated into tangible performance and sustainability outcomes.

3. Research and Contextual Evidence Pertaining to Samut Sakhon Province

Samut Sakhon Province is widely recognized as a strategic industrial hub, particularly in food processing, health products, and related manufacturing sectors (Samut Sakhon Provincial Industry Office). Over the past five years, the number of OEM operators in the supplement and cosmetic industries has increased by more than 15 percent in response to rising domestic and international demand. However, empirical studies indicate that many local operators continue to face challenges related to sustainable resource management and the comprehensive adoption of BCG principles (Worapongpat & Uttamavangso, 2024).In addition, increasing competition from large-scale manufacturers places pressure on small and medium-sized OEM operators to clearly define and implement competitive strategies in order to maintain their market position and operational viability (Yicheng, Worapongpat, & Wongkumchai, 2024). These contextual factors underscore the need for an integrated strategic approach that combines BCG Model implementation with competitive strategy formulation to enhance sustainability and competitiveness at the provincial level.

4. Research Gap and Conceptual Linkage

The reviewed literature confirms that both the BCG Model and competitive strategies play crucial roles in enhancing organizational capacity, competitiveness, and sustainable performance. However, a significant research gap remains due to the lack of empirical studies examining the integrated relationship between the BCG Model, competitive strategies, and SDG achievement within the health and beauty supplement OEM industry in Samut Sakhon Province (Zhi Chao, Wongkumchai, & Worapongpat, 2023). Given the province's economic importance and high growth potential, this gap limits the development of evidence-based strategies and policy recommendations.

Accordingly, this study seeks to bridge this gap by integrating the concepts of the BCG Model, competitive strategies, and SDG achievement within a single analytical framework. By doing so, the research aims to generate new academic knowledge and provide practical guidelines for OEM operators and relevant public and private sector agencies to promote sustainable industrial development in the future.

Conceptual Framework

Independent Variables (IVs): Application of the BCG Model
Bioeconomy: Value creation from biological resources
Circular Economy: Resource efficiency and waste minimization
Green Economy: Environmentally sound and clean development

Mediating Variables (Mediators) / Process Variables: Competitive Strategies of OEM Operators
(Based on Porter's Generic Strategies)
Cost Leadership Strategy
Differentiation Strategy

Focus Strategy (Niche Market Penetration)

Dependent Variables (DVs): Achievement of Sustainable Development Goals (SDGs)

SDG 7: Affordable and Clean Energy

SDG 8: Decent Work and Economic Growth

SDG 9: Industry, Innovation, and Infrastructure

SDG 12: Responsible Consumption and Production

SDG 13: Climate Action

Research Context and Scope

Research Area: Health and Beauty Supplement OEM Industry

Target Group: OEM operators within the local administrative areas of Samut Sakhon Province

This conceptual framework proposes that the application of the BCG Model directly influences both competitive strategies and SDG achievement. Additionally, competitive strategies are expected to mediate the relationship between BCG Model application and SDG achievement. The framework provides a structured basis for empirical testing and is illustrated in Figure 1: Conceptual Framework for the Research.

Research Methodology

1. Population and Sample

The population of this quantitative research comprised all registered Original Equipment Manufacturer (OEM) operators in the health and beauty supplement industry located within the local administrative areas of Samut Sakhon Province. According to data obtained from the Samut Sakhon Provincial Industry Office, a total of 78 OEM companies were identified.

The sample size was determined using the formula proposed by Taro Yamane (1973) to ensure adequate representation of the population characteristics. Based on this calculation, a total of 385 respondents were required. The respondents consisted of business owners, top executives, and production or product development managers who are directly involved in strategic decision-making processes within the target companies. Multiple respondents from each firm were included to enhance the robustness of organizational-level data.

2. Research Instrument

The primary research instrument employed in this study was a structured questionnaire, developed in accordance with the theoretical foundations of the BCG Economic Model (Bio–Circular–Green Economy), Porter's Generic Competitive Strategy Theory, and the Resource-Based View (RBV). The questionnaire was structured into four main sections:

Part 1: General information of respondents

Part 2: Application of the BCG Model (Bioeconomy, Circular Economy, and Green Economy)

Part 3: Application of competitive advantage strategies (Cost Leadership, Differentiation, and Focus Strategy)

Part 4: Achievement of Sustainable Development Goals (SDGs)

The development of the questionnaire began with a qualitative synthesis derived from in-depth interviews with five experts and representatives from the Samut Sakhon Federation of Industry. Subsequently, content validity was assessed using the Index of Item–Objective Congruence (IOC). Three subject-matter experts evaluated the questionnaire items, and only items with an IOC value of 0.66 or higher were retained.

Following content validation, a pilot test (try-out) was conducted with 50 OEM operators located in a neighboring province to evaluate the reliability of the instrument. The

reliability analysis yielded a Cronbach's alpha coefficient of 0.92, indicating a high level of internal consistency and reliability.

3. Data Collection

Data collection was conducted using both online and offline approaches to maximize response rates and ensure coverage of the target population. Online data were collected via platforms such as Google Forms and SurveyMonkey. In addition, coordination with the Samut Sakhon Federation of Industry facilitated access to OEM operators within the province. For respondents who were unable to complete the online questionnaire, face-to-face data collection was carried out by the researcher. Through these combined methods, the targeted sample size of 385 respondents was successfully achieved.

4. Data Analysis

Data analysis involved both descriptive and inferential statistical techniques. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize respondents' demographic characteristics and to describe the levels of BCG Model application, competitive strategy implementation, and SDG achievement.

Inferential statistical analysis comprised correlation analysis to examine the relationships among the study variables. In addition, path analysis using Structural Equation Modeling (SEM) was employed to test the hypothesized causal relationships. This approach enabled the examination of both direct and indirect effects of BCG Model application and competitive strategies on the achievement of Sustainable Development Goals.

Research Findings

1. Characteristics of the Sample Population

A total of 253 completed questionnaires were collected from OEM operators in the health and beauty supplement industry in Samut Sakhon Province. Table 1 presents the demographic characteristics of the respondents.

Table 1: Demographic Characteristics of Respondents (n = 253)

Characteristic	Count	Percentage (%)
Gender		
Male	112	44.3
Female	141	55.7
Age		
25–30 years	58	22.9
31–35 years	95	37.5
36–40 years	60	23.7
41 years and above	40	15.8
Education Level		
Bachelor's degree	142	56.1
Master's degree	80	31.6
Others	31	12.3
Job Position		
Business owner	120	47.4
Executive/Manager	80	31.6

Characteristic	Count	Percentage (%)
Officer/Employee	53	21.0
Number of Employees		
Less than 25	90	35.6
25–50	95	37.5
More than 50	68	26.9

The sample predominantly consisted of female respondents, individuals aged 31–35 years, bachelor's degree holders, and business owners or executives, indicating that the data were collected from respondents directly involved in organizational decision-making.

2. Level of BCG Model Application

In response to Objective 1, the level of BCG Model application among OEM operators was examined. Overall, the application of the BCG Model was rated at a high level (Mean = 4.10, SD = 0.76). All three components Bioeconomy, Circular Economy, and Green Economy also demonstrated high levels of implementation, as shown in Table 2.

Table 2: Level of BCG Model Application

Component	Mean	SD	Level
Bioeconomy	4.12	0.72	High
Circular Economy	4.08	0.78	High
Green Economy	4.10	0.80	High
Overall	4.10	0.76	High

These results indicate that OEM operators actively integrate sustainability-oriented practices into their operations.

3. Application of Competitive Strategies

The overall application of competitive strategies was also rated at a high level (Mean = 4.13, SD = 0.76). Among the three strategies, the Focus Strategy (Niche Market Penetration) achieved the highest mean score, reflecting OEM operators' emphasis on specialized markets (Table 3).

Table 3: Level of Competitive Strategy Application

Strategy	Mean	SD	Level
Cost Leadership Strategy	4.13	0.75	High
Differentiation Strategy	4.07	0.79	High
Focus Strategy (Niche Market)	4.18	0.73	High
Overall	4.13	0.76	High

4. Achievement of Sustainable Development Goals (SDGs)

The achievement of Sustainable Development Goals was perceived at a high level overall (Mean = 4.11, SD = 0.79). Among the SDGs examined, SDG 8 (Decent Work and Economic Growth) recorded the highest level of achievement, followed by SDG 12 (Responsible Consumption and Production) (Table 4).

Table 4: Level of SDG Achievement

SDG	Mean	SD	Level
SDG 7: Affordable and Clean Energy	4.05	0.80	High
SDG 8: Decent Work and Economic Growth	4.17	0.77	High
SDG 9: Industry, Innovation, and Infrastructure	4.10	0.79	High
SDG 12: Responsible Consumption and Production	4.14	0.78	High
SDG 13: Climate Action	4.11	0.81	High
Overall	4.11	0.79	High

5. Correlation Analysis of Variables

To address Objective 2, Pearson correlation analysis was conducted. The results indicate significant positive correlations among all variables at the 0.01 significance level, as shown in Table 5.

Table 5: Correlation Matrix

Variable	BCG Model	Competitive Strategy	SDGs
BCG Model	1.000	0.805**	0.790**
Competitive Strategy	0.805**	1.000	0.920**
SDGs	0.790**	0.920**	1.000

Note: $p<0.01$

The strongest correlation was observed between Competitive Strategy and SDG Achievement ($r = 0.920$), indicating a very strong relationship

6. Path Analysis Results

Regression analysis was conducted to test the hypothesized causal relationships.

1. BCG Model → Competitive Strategy
   - $\beta = 0.805$
   - $R^2 = 0.648$
   - $p < 0.001$
   - Interpretation: The BCG Model significantly and positively influences the adoption of competitive strategies.
2. BCG Model → SDG Achievement
   - $\beta = 0.790$
   - $R^2 = 0.624$
   - $p < 0.001$
   - Interpretation: The BCG Model directly and significantly predicts SDG achievement.
3. Competitive Strategy → SDG Achievement
   - $\beta = 0.920$
   - $R^2 = 0.846$
   - $p < 0.001$
   - Interpretation: Competitive strategy is the strongest predictor of SDG achievement among OEM operators.

7. Direct, Indirect, and Total Effects

The mediation analysis confirms that competitive strategy significantly mediates the relationship between the BCG Model and SDG achievement.

Table 6: Structural Effects of the BCG Model and Competitive Strategy on SDGs

Independent Variable	Dependent Variable	Direct Effect	Indirect Effect	Total Effect
BCG Model	Competitive Strategy	0.805	–	0.805
Competitive Strategy	SDGs	0.920	–	0.920
BCG Model	SDGs	0.790	0.805 × 0.920 = 0.741	1.531

The total effect of the BCG Model on SDG achievement (1.531) is substantial, resulting from both a strong direct effect and a significant indirect effect through competitive strategies.

Summary of Key Findings

- OEM operators in Samut Sakhon Province demonstrate a high level of BCG Model application, with a strong emphasis on focus (niche) competitive strategies.
- Both the BCG Model and competitive strategies significantly and positively influence SDG achievement.
- The highest levels of SDG achievement were observed for SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production).
- The mediation analysis confirms that competitive strategy plays a critical role in translating BCG principles into sustainable development outcomes.
- Recommendation: Future studies should validate these causal relationships using full Structural Equation Modeling (SEM) with goodness-of-fit indices to enhance model robustness and precision.

Discussion

Discussion of Objective 1: Levels of Application and Achievement. The findings related to Objective 1 reveal that Original Equipment Manufacturer (OEM) operators in the health and beauty supplement industry in Samut Sakhon Province demonstrate a high level of application of the BCG Model, competitive strategy adoption, and achievement of Sustainable Development Goals (SDGs) across all key constructs. BCG Model Application. The high level of BCG Model application encompassing the Bioeconomy, Circular Economy, and Green Economy indicates that national policy initiatives promoting the BCG framework have effectively diffused into the local manufacturing sector (Jain, Chou, Fan, & Santoso, 2021). OEM operators appear to recognize the strategic value of BCG principles, particularly in enhancing resource efficiency, reducing environmental impacts, and meeting stringent international export requirements related to sustainability. These requirements are especially prominent in markets such as the European Union and the United States, where compliance with environmental and production standards has become a prerequisite for market access. This finding is consistent with Jianyu, Wongkumchai, and Worapongpat (2024), who reported that BCG implementation significantly enhances the competitiveness of small and medium-sized enterprises (SMEs) in food and industrial sectors. The results suggest that OEM manufacturers increasingly view the BCG Model not merely as a regulatory obligation but as a strategic tool that supports long-term competitiveness and sustainable value creation. Competitive Strategy Adoption. The results further indicate that the overall adoption of competitive strategies among OEM operators is at a high level, with the Focus Strategy (niche market penetration) receiving the highest mean score. This strategic preference can be attributed to the highly competitive and fragmented nature of the OEM industry in Samut Sakhon Province, where smaller and medium-sized operators face intense competition from large-scale domestic and international manufacturers. As a result, OEM firms are compelled to differentiate themselves through specialization, such as sourcing unique bio-ingredients, adopting specialized production processes, or targeting specific international niche markets,

rather than competing solely on cost leadership. This finding supports the argument of Liu, Niyomsilp, and Worapongpat (2020), who emphasized that a focus strategy is particularly effective in industries characterized by intense rivalry and resource constraints. Moreover, it aligns with Sirilertworakul (2021), who highlighted the importance of localized specialization and market segmentation as a means of sustaining competitiveness in export-oriented manufacturing sectors. SDG Achievement. The achievement of the selected SDGs was also perceived at a high level, with the strongest performance observed for SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production). This outcome suggests a strong perceived linkage between sustainable operational practices and tangible business benefits. In particular, the adoption of Circular and Green Economy principles appears to contribute to improved operational efficiency, cost reduction, and compliance with international standards, which in turn support economic growth and responsible production practices. These findings are consistent with the broader sustainability literature, which emphasizes that environmentally responsible practices can enhance long-term economic performance, organizational resilience, and stakeholder trust. The results further indicate that OEM operators perceive sustainability not as a trade-off with profitability, but as a complementary driver of economic and operational success.

Discussion of Objective 2: Path Relationships among BCG Model, Competitive Strategies, and SDG Achievement. The analysis addressing Objective 2 confirms a strong and statistically significant causal structure among the BCG Model, competitive strategies, and SDG achievement. Notably, the results highlight the central mediating role of competitive strategy in translating BCG principles into sustainable development outcomes. Direct Causal Relationships. The strong direct relationship between the BCG Model and competitive strategy adoption indicates that the implementation of Bioeconomy, Circular Economy, and Green Economy practices serves as a foundational strategic resource for OEM operators. Investments in bio-based inputs, waste reduction systems, and environmentally friendly technologies generate valuable, rare, and difficult-to-imitate resources that enable firms to successfully pursue differentiation and focus strategies. This finding is consistent with Rattanasuksri, Sonsuphap, and Pongpanich (2024), who argued that sustainability-oriented resources enhance firms' ability to develop sustainable competitive advantages. Furthermore, the relationship between competitive strategy and SDG achievement emerged as the strongest in the model, underscoring the importance of strategic execution in achieving measurable sustainability outcomes. For example, a focus strategy centered on natural or sustainable products inherently requires responsible production processes and environmental stewardship, directly contributing to SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action). This finding supports the conclusions of Tao, Wongkumchai, and Worapongpat (2024), who emphasized that sustainability must be embedded within a firm's core competitive strategy to yield substantive and observable impacts. Mediating Role of Competitive Strategy. Crucially, the results demonstrate that the BCG Model exerts a substantial indirect effect on SDG achievement through competitive strategy, resulting in a very strong total effect. This confirms that competitive strategy functions as a key mediating mechanism in this context. The underlying causal pathway can be summarized as:BCG Model Application (Strategic Resources) Competitive Strategy (Strategic Action) SDG Achievement (Sustainable Outcomes) This mechanism aligns closely with the Resource-Based View (RBV) (Vasasiri & Damnet, 2024), which posits that organizational performance depends not only on the possession of valuable resources but also on the firm's ability to deploy those resources effectively through strategic actions. In this study, the BCG Model represents a bundle of sustainability-oriented resources such as green technologies, bio-based innovations, and circular production systems that, when leveraged through appropriate competitive strategies, generate superior sustainable performance, as reflected in SDG achievement. Overall, the

findings provide both conceptual and empirical evidence that the BCG Model is not merely an environmental or policy-driven framework, but a powerful strategic enabler for OEM manufacturers. By integrating BCG principles into competitive strategy formulation, OEM operators can simultaneously enhance competitiveness and contribute meaningfully to sustainable development objectives.

New Knowledge Derived from the Research

Based on the investigation into the impact of the BCG Model application and competitive strategies on the achievement of Sustainable Development Goals (SDGs) in the Health and Beauty Supplement OEM industry in Samut Sakhon Province, the following new knowledge can be synthesized and summarized in the diagram below:

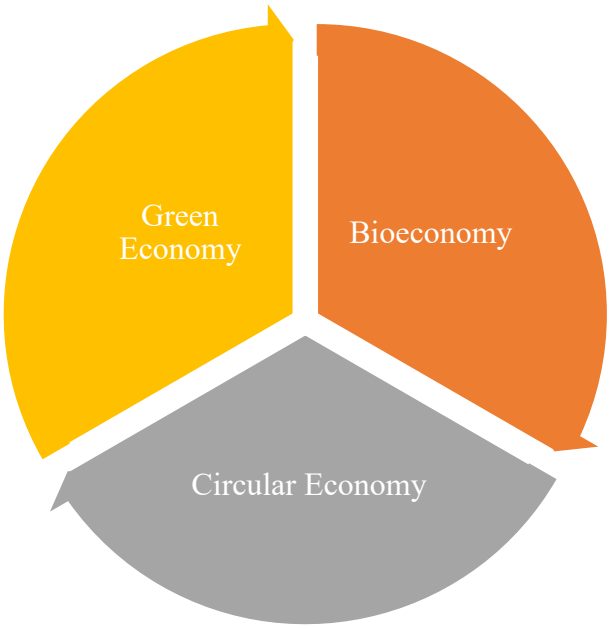

Figure 2. The Impact of BCG Model Application and Competitive Strategies on SDG Achievement in the Health and Beauty Supplement OEM Industry in Samut Sakhon Province

Figure 2 illustrates a newly confirmed hierarchical causal mechanism among the key variables within the health and beauty supplement OEM industry in Samut Sakhon Province. The findings indicate that the application of the BCG Model, encompassing the Bioeconomy, Circular Economy, and Green Economy, functions as the primary antecedent factor that enables OEM operators to develop and implement effective competitive strategies, particularly the Focus (niche market) strategy.

Competitive strategies emerge as the most immediate and influential driver of Sustainable Development Goal (SDG) achievement, acting as a critical mediating mechanism that translates sustainability-oriented resources into measurable sustainable outcomes. The model confirms that while the BCG Model exerts a direct effect on SDG achievement, its indirect effect through competitive strategies is substantial, resulting in a strong total effect.

These results demonstrate that, within the Samut Sakhon OEM sector, sustainability initiatives based on the BCG framework must be strategically operationalized through core business strategies to maximize their impact on sustainable development. The significant mediating role of competitive strategy highlights that the effectiveness of BCG implementation depends not only on environmental or resource-based practices, but also on their integration into market-driven and value-creating strategic actions.

Conclusion

This study confirms that Original Equipment Manufacturer (OEM) operators in the health and beauty supplement industry in Samut Sakhon Province demonstrate a high level of engagement in the application of the BCG Model and the adoption of competitive strategies, resulting in a high perceived achievement of key Sustainable Development Goals (SDGs) particularly SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production).

The principal contribution of this research lies in its empirical validation of the causal path relationship among the BCG Model, competitive strategies, and SDG achievement. The findings demonstrate a strong and statistically significant positive relationship in which the BCG Model influences SDG achievement both directly and indirectly through competitive strategies. Competitive strategy serves as a critical mediating mechanism, ensuring that sustainability-oriented inputs derived from the BCG framework are effectively translated into measurable and actionable sustainable performance outcomes.

By integrating the BCG Model with competitive strategy theory and the Resource-Based View (RBV), this study advances theoretical understanding of how sustainability frameworks can be strategically operationalized at the firm level. Practically, it illustrates how the BCG Model can evolve from a national policy initiative into a tangible driver of localized business competitiveness and sustainable industrial development within a high-growth manufacturing cluster.

Recommendations

1. Recommendations for Practical Utilization

Recommendations Based on Objective 1 Findings

Although the results indicate a high overall level of BCG Model application and competitive strategy adoption, OEM operators exhibit a strong preference for Focus (niche market) strategies, while Differentiation and Cost Leadership strategies demonstrate comparatively lower mean scores. Therefore, relevant agencies such as the Department of Industrial Promotion and the Samut Sakhon Provincial Industry Office should prioritize initiatives that promote advanced applications of differentiation and cost efficiency.Specifically, targeted training and support programs should be provided in areas such as advanced green technologies, carbon footprint reduction, energy efficiency, and sustainable packaging innovation. These initiatives would enable OEM operators to diversify their competitive advantages beyond niche markets and strengthen their resilience in highly competitive global value chains.

Recommendations Based on Objective 2 Findings

The findings further reveal that competitive strategy exerts the strongest direct influence on SDG achievement and significantly mediates the relationship between the BCG Model and sustainable outcomes. Consequently, policy and support mechanisms should move beyond technical or compliance-focused BCG training and instead emphasize strategic integration. Relevant agencies should incorporate the BCG Model into strategic planning and business development workshops, rather than limiting it to environmental or production-focused initiatives. The development of a Strategic Sustainability Integration Framework is recommended to guide OEM operators in translating Bioeconomy, Circular Economy, and Green Economy resources into concrete, market-driven strategies. For example, bio-based inputs could be strategically leveraged to support quality differentiation, while circular production systems could enhance cost leadership and operational efficiency. Such integration

would ensure that sustainability initiatives are explicitly linked to both business performance and SDG targets.

2. Recommendations for Future Research

This study identifies a significant causal mechanism linking the BCG Model, competitive strategies, and SDG achievement, particularly highlighting the strong mediating role of competitive strategy. This novel finding provides a foundation for further research in other high-growth manufacturing clusters in Thailand, such as medical devices, logistics, and specialized OEM industries.

Future research should consider the following directions:

Investigating the antecedents of successful BCG Model implementation, particularly the roles of organizational culture, top management commitment, and leadership orientation, which may significantly influence the effectiveness of BCG adoption and subsequent strategic outcomes.

Employing full Structural Equation Modeling (SEM) with larger sample sizes to validate overall model fit and enable multi-group analysis, such as comparing path relationships between small and large OEM firms. This approach would enhance the precision of policy and managerial recommendations.

Expanding the scope of SDGs examined to include SDG 1 (No Poverty) and SDG 17 (Partnerships for the Goals) in order to capture the broader socio-economic and collaborative impacts of the BCG strategy on regional supply chains and community development.

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