E-ISSN: 2963-4946
Vol. 4 No. 11 November 2026, pp. 4891-4904
DOI: 10.59888/ajosh.v4i11.785

Asian Journal of Social and Humanities

COMPETITIVE FORCES AND STRATEGIC OPPORTUNITIES IN THE STEVIA INDUSTRY A PORTER'S FIVE FORCES ANALYSIS OF THE NATURAL SWEETENER MARKET

Rina Indrayani*, Herman Ruswan Suwarman,
Danny Aidil Rismayadi
Institut Teknologi Bandung, Indonesia
Email : rina@utb-univ.ac.id*

Keywords:
porter's five forces;
stevia;
natural sweetener;
industry competition;
competitive strategy.

This is an open access article under the CC BY-SA license.

Copyright © 2026 by Author. Published by Pelopor Publikaasi Akademika

Abstract

Increasing health awareness and the implementation of sugar-reduction policies have stimulated demand for natural, low-calorie sweeteners, with stevia (Stevia rebaudiana Bertoni) emerging as a prominent alternative. However, research on competitive strategies in the stevia industry remains limited and has predominantly focused on individual firms rather than industry-wide competitive dynamics. This study examined the competitive structure of the stevia-based sweetener industry using Porter's Five Forces framework and identified strategic opportunities across the upstream, midstream, and downstream segments of the value chain. A descriptive qualitative research design was employed, drawing on secondary data from global market reports, scientific publications, and previous studies on stevia business strategies. The collected evidence was systematically organized, categorized, and triangulated to assess the intensity of each competitive force using a three-level classification of low, medium, and high. The findings indicated that the bargaining power of buyers and the threat of substitutes were high, while the threat of new entrants and competitive rivalry were classified as medium to high. The bargaining power of suppliers was assessed as low to medium, although substantial differences were identified between stevia farmers and steviol glycoside extract manufacturers. Barriers to entry were relatively low in downstream distribution and marketing but considerably higher in extraction and purification activities. Strategic opportunities were identified in increasing global demand for sugar-reduced products, expanding markets in the Asia-Pacific region, developing domestic supply chains, and advancing technologies for the production of rebaudioside M (Reb M). The study recommended contract farming partnerships to strengthen upstream supply chains, research and development initiatives to improve sweetness profiles and reduce undesirable aftertastes in midstream processing, and brand differentiation supported by scientifically substantiated health-related claims in downstream markets. Given its reliance on secondary data, the findings should be interpreted as qualitative assessments of competitive conditions rather than precise quantitative measurements of market forces.

INTRODUCTION

Excessive sugar consumption is a major contributing factor to the increasing prevalence of noncommunicable diseases, including type 2 diabetes and obesity, and is associated with elevated risks of hypertension in many countries (Rahman et al., 2025). Growing health awareness has consequently encouraged consumer interest in low-calorie, naturally derived

sweeteners, particularly stevia (Stevia rebaudiana Bertoni), a plant belonging to the family Asteraceae. Its leaves contain steviol glycosides, compounds with sweetness intensities approximately 200–300 times that of sucrose, depending on the specific glycoside, while contributing negligible calories at typical levels of use (Indrayani, Ghofar, et al., 2025; Kamarulzaman et al., 2014; Li et al., 2021).

Increasing concerns about excessive sugar intake have also stimulated commercial interest in low-calorie sweeteners (Daher et al., 2022). Market estimates presented in Figure 1 valued the global stevia market at approximately USD 513.4 million in 2023, with reported applications distributed across beverages (36%), food products (26%), tabletop sweeteners (22%), pharmaceuticals (11%), and other uses (5%) (Grand View Research, 2023). These figures indicated that food and beverage applications collectively accounted for the largest share of the reported market. However, market estimates and forecasts reflect the assumptions, coverage, and methodologies of the reporting organization and should not be interpreted as direct evidence of actual consumer purchasing behavior.

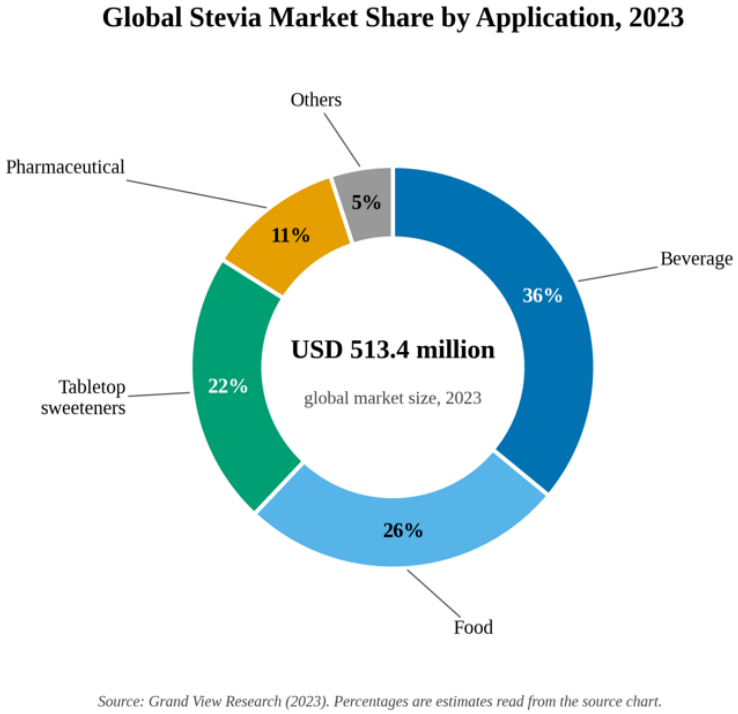

Figure 1. Global stevia market share by application, 2023 (%). (percentages estimated from the cited source chart).

Source: Grand View Research (2023).

The Asia-Pacific region has been reported to account for the largest share of the global stevia market, supported by established patterns of natural sweetener consumption and a substantial population affected by diabetes. Regulatory developments, including the recognition of certain high-purity steviol glycosides as Generally Recognized as Safe (GRAS) for specified uses in the United States, alongside the introduction of products incorporating rebaudioside M (Reb M) by multinational beverage companies such as Coca-Cola and PepsiCo, have further supported market expansion (Anwar et al., 2023; Pérez et al., 2016).

In Indonesia, the strategic relevance of stevia extends beyond consumer demand to opportunities in agricultural cultivation, industrial processing, and product branding. Previous

research on Stevia rebaudiana cultivation in Tawangmangu, Central Java, examined its competitiveness as an alternative sweetener (Putri et al., 2019). Although this research highlighted potential opportunities in upstream agricultural production, it did not independently establish the existence of national policies specifically promoting stevia cultivation or demonstrate that domestic stevia production could substitute for imported sugar. Therefore, the commercial implications of domestic cultivation potential must be evaluated alongside market accessibility, extraction and purification capabilities, regulatory compliance with food safety requirements, and consumer acceptance.

An important research gap remains concerning the unit of analysis used to evaluate competitive dynamics in the stevia industry. Rasyid et al. (2025) applied Porter's Five Forces framework and strengths, weaknesses, opportunities, and threats (SWOT) analysis to an individual stevia enterprise, providing insights into firm-level strategic planning but offering limited understanding of how bargaining power, competitive pressures, and barriers to entry vary among agricultural producers, steviol glycoside extract manufacturers, and consumer product brands. Meanwhile, de Andrade et al. (2024) investigated improvements in the utilization of stevia as a source of steviol glycosides rather than systematically examining competitive forces across the industry's value chain. Although these studies contributed complementary economic and technological perspectives, neither provided a differentiated industry-level assessment of all five competitive forces within the Indonesian stevia market. This limitation highlighted the need for a comprehensive yet evidence-sensitive strategic synthesis that distinguishes the competitive conditions faced by different value-chain participants rather than assuming a homogeneous industry structure.

Accordingly, this study aimed to examine the threat of new entrants, the bargaining power of suppliers and buyers, the threat of substitute products, and competitive rivalry within the stevia-based natural sweetener industry using Porter's Five Forces framework (Pangarkar & Prabhudesai, 2024; Porter, 1980, 2008). The analysis further investigated how the intensity and implications of these competitive forces differed across upstream cultivation, midstream extraction and purification, and downstream product development, branding, and distribution. Particular emphasis was placed on distinguishing qualitative assessments supported by secondary evidence from causal interpretations or quantitative market claims that could not be substantiated by the available sources.

The novelty of this study lay in its value-chain-sensitive assessment of competitive forces rather than the application of Porter's Five Forces framework alone. By integrating industry structure analysis with value chain analysis (Ensign, 2001; Porter, 1985), the study connected competitive pressures with differentiated strategic opportunities, including supply-chain partnerships for agricultural producers, technological innovation and processing efficiency for extract manufacturers, and credible product differentiation for consumer-facing brands. From a practical perspective, the findings were intended to provide industry managers, investors, and prospective market entrants with a structured understanding of competitive pressures and strategic opportunities across the stevia value chain. Academically, the study contributed to strategic management literature by demonstrating how aggregate industry-level assessments may obscure substantial differences in bargaining positions, entry barriers, and competitive advantages among value-chain participants. Consequently, the conclusions were presented as

evidence-informed qualitative interpretations rather than direct quantitative measurements of market power.

METHOD

This study employed a descriptive qualitative approach using Porter's Five Forces framework to examine the competitive structure of the stevia-based natural sweetener industry. The analysis drew on secondary data from market reports, scientific publications on stevia cultivation and processing, regulatory literature, and previous business strategy studies. The unit of analysis encompassed competitive relationships within and across three value-chain segments: upstream cultivation, midstream ingredient manufacturing, and downstream product branding and distribution. Relevant documentary sources were purposively selected based on their relevance to industry competition and strategic opportunities. However, the absence of a fully documented literature search and screening process limited the comprehensiveness of the evidence base.

The collected evidence was organized into five competitive dimensions: the threat of new entrants, the bargaining power of suppliers, the bargaining power of buyers, the threat of substitutes, and competitive rivalry. Each dimension was examined by comparing evidence concerning technological requirements, barriers to entry, product differentiation, purchasing arrangements, substitute products, and market demand across the identified value-chain segments. Competitive intensity was assessed qualitatively using low, medium, and high classifications, with intermediate ratings applied where evidence indicated variations across industry segments. The assessment indicators were presented in Table 1. Because the classifications were based on qualitative interpretations of secondary evidence rather than a validated quantitative measurement scale, the findings were reported as indicative assessments of competitive intensity rather than statistically measured industry indices.

Table 1. Indicators used to assess each competitive force

Competitive force	Indicators examined	Evidence considered
Threat of new entrants	Capital and R&D requirements; technology and certification (GRAS, BPOM); access to raw material and distribution; brand loyalty	Market reports; scientific literature; regulatory documents
Bargaining power of suppliers	Number and concentration of suppliers; uniqueness of supplier technology; switching costs; fragmentation of farmers	Agronomic literature; market reports; prior studies
Bargaining power of buyers	Buyer concentration and purchase volume; price sensitivity; availability of alternatives; scope for brand loyalty	Market reports; consumer-perception studies
Threat of substitutes	Number and accessibility of substitutes; relative price and taste; consumer perception	Market reports; scientific literature
Competitive rivalry	Number and diversity of competitors; market growth; degree of differentiation; pace of innovation	Market reports; prior business-strategy studies

Source: Qualitative synthesis of the cited secondary literature.

Findings were synthesised through cross-source comparison and interpreted alongside Porter's value-chain perspective to derive practical implications for cultivation, purification, and consumer-oriented marketing. Reports describing market forecasts were kept conceptually separate from empirical findings, and differing baselines or forecast periods were not combined into a single statistical trend. Source triangulation improves transparency but cannot replace interviews with industry participants, price and transaction datasets, or a documented quality-appraisal protocol. Future work should test these qualitative judgements with primary evidence from farmers, processors, distributors, and institutional buyers.

RESULTS AND DISCUSSION

The competitive structure of the natural stevia sweetener industry can be examined through Porter's Five Forces framework, which assesses the intensity of competition and the external pressures that influence industry profitability and strategic positioning. Figure 2 summarises the assessed intensity of the five forces.

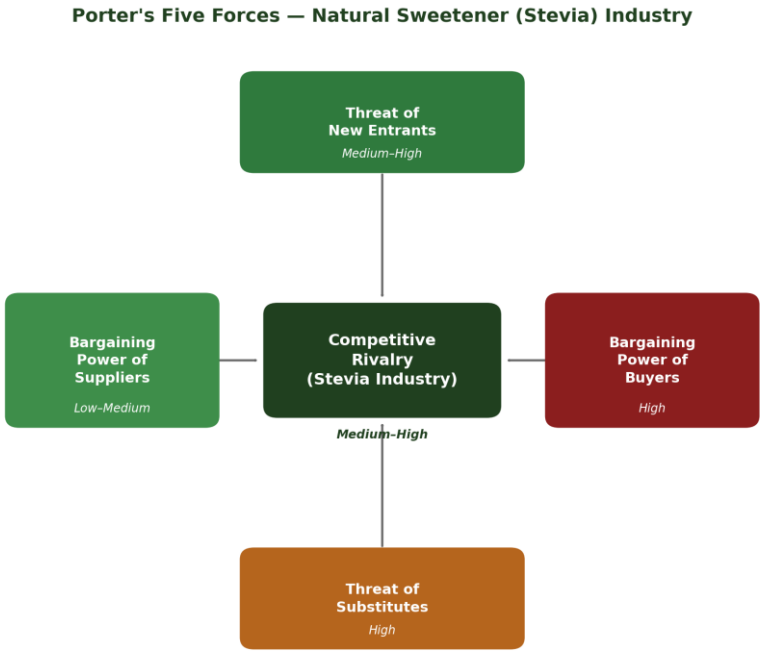

Figure 2. Porter's Five Forces mapping of the natural sweetener (stevia) industry.
Source: Illustration reproduced from the submitted research manuscript.

As Figure 2 shows, the bargaining power of buyers and the threat of substitutes are assessed as high, indicating substantial competitive pressure on firms in the natural stevia sweetener industry. The threat of new entrants and competitive rivalry are both assessed as medium–high, while the bargaining power of suppliers is assessed as low–medium, indicating comparatively weaker supplier influence in the aggregate industry structure.

Table 2 summarises the assessment, and Table 3 shows how the three forces that vary most along the value chain differ by segment. The following subsections discuss the underlying drivers, implications, and strategic responses for each force.

Table 2. Summary of the Porter's Five Forces analysis of the natural stevia sweetener industry

Competitive force	Intensity	Key determining factors
Threat of new entrants	Medium–High	Low barriers downstream (packaging and blending of consumer products), but high barriers midstream (extraction and refining of steviol glycosides) owing to the need for enzymatic or fermentation technology, GRAS/BPOM certification, and substantial R&D capital.
Bargaining power of suppliers	Low–Medium	Stevia farmers are generally small-scale and fragmented, giving individual farmers low bargaining power; global extract hold greater power owing to their control of Reb-M/Reb-D purification technology.
Bargaining power of buyers	High	Industrial food and beverage manufacturers represent important downstream buyers of stevia, while importers, distributors, and processors may handle substantial volumes and negotiate prices based on product quality, specifications, and traded volumes. This purchasing structure can strengthen buyer bargaining power, particularly when buyers can compare suppliers across international market
Threat of substitutes	High	Cane sugar, palm sugar, honey, agave syrup, monk fruit, allulose, and synthetic sweeteners (aspartame, sucralose) are readily accessible alternatives, reinforced by the bitter aftertaste still present in some first-generation stevia products.
Competitive rivalry	Medium–High	Rivalry is intensifying among multinational raw-material producers, national manufacturers, and health-oriented start-ups competing through brand differentiation, packaging, and digital channels.

Source: Qualitative synthesis of the cited secondary literature.

Table 3. Segment-level assessment of the three forces that vary along the value chain

Competitive force	Upstream (cultivation)	Midstream (extraction and refining)	Downstream (consumer brands)
Threat of new entrants	Low–Medium: limited suitable highland areas and seedling-propagation constraints	Low: fermentation or enzymatic expertise, GRAS/BPOM compliance, and R&D capital are required	High: repackaging and marketing need little production investment
Bargaining power of suppliers	Low: small-scale, dispersed farmers	Low: raw leaf supplied by fragmented farmers	Medium–High: few producers can supply Rebaudioside M with a sugar-like taste
Bargaining power of buyers	High: collectors and processors set prices	High: multinational F&B buyers purchase in volume and set specifications	Medium–High: fragmented but price-sensitive consumers; loyalty can reduce price sensitivity

Source: Qualitative synthesis of the cited secondary literature.

Threat of New Entrants

Barriers to entry vary considerably along the value chain. In the downstream segment, particularly the repackaging and marketing of ready-to-consume stevia sweeteners, barriers are relatively low because these activities require little production investment. This is consistent with the presence of start-ups targeting the health and wellness market. In contrast, entry into the upstream and midstream segments, particularly large-scale cultivation and the extraction and purification of next-generation steviol glycosides such as Rebaudioside M, is considerably more challenging (Jiang et al., 2026). These activities require specialised expertise in fermentation or enzymatic modification, compliance with food-safety requirements such as GRAS and BPOM standards, and substantial investment in R&D. This difference helps explain why the downstream market is fragmented, while the standardised extract segment remains concentrated among a relatively small number of multinational companies.

Bargaining Power of Suppliers

At the farmer level, bargaining power tends to be low because stevia cultivation in Indonesia is generally small-scale and dispersed. Farmers also face production uncertainty related to weather, limited highland areas suitable for cultivation, and the success of seedling propagation (Indrayani et al., 2025; Putri et al., 2019). These conditions make farmers vulnerable to price fluctuations and leave them with limited influence over prices determined by collectors and processors further along the value chain (Assefa et al., 2015). The situation differs for global extract manufacturers that possess advanced technologies for producing next-generation steviol glycosides. Their bargaining power over downstream brands is relatively strong because only a limited number of companies can produce Rebaudioside M with a taste profile close to that of sugar (Jiang et al., 2026). The aggregate low–medium rating in Table 2 therefore averages two very different positions: weak suppliers at the farm gate and strong suppliers at the extract level (Table 3).

Bargaining Power of Buyers

Buyer bargaining power is high, particularly in the business-to-business (B2B) segment, where multinational food and beverage companies such as Coca-Cola and PepsiCo purchase standardised sweetener materials in large volumes (de Andrade et al., 2024). Their purchasing scale gives them considerable influence over both price and product specifications. At the consumer level, bargaining power is more dispersed, but price sensitivity remains relatively high because consumers can choose from a wide range of alternative sweeteners. Companies can reduce this sensitivity by building brand loyalty through product differentiation and health- and lifestyle-oriented positioning, as illustrated by the branding of PT Sweet on Stevia, which targets health-conscious young consumers (Indrayani, Ghofar, et al., 2025) similarly found that incorporating consumer-perception insights into marketing strategy can strengthen brand loyalty for stevia-based products. These findings suggest that a strong and credible health-oriented value proposition can reduce consumers' reliance on price in purchase decisions.

Threat of Substitutes

The threat of substitutes is the strongest competitive force affecting the attractiveness of the stevia industry. Substitutes include conventional cane sugar, the incumbent product; traditional natural sweeteners such as liquid palm sugar, honey, and agave syrup; newer natural

sweeteners such as monk fruit and allulose; and synthetic sweeteners such as aspartame and sucralose. This range of alternatives gives consumers and food manufacturers many choices and increases competitive pressure on stevia products. The pressure is reinforced by the bitter aftertaste associated with some first-generation stevia products (Ashwell, 2015). Some of these sweeteners may also be blended with stevia and therefore act as complements as well as substitutes. The threat may gradually decline as advances in Rebaudioside M purification improve the taste profile of stevia and bring it closer to that of sugar (Jiang et al., 2026).

Competitive Rivalry

Competitive intensity is assessed as medium–high, reflecting competition among multinational ingredient suppliers, established national brands, and emerging downstream brands. Competition occurs through product quality, pricing, product differentiation, packaging innovation, and digital marketing. The coexistence of large-scale producers and smaller market-oriented brands creates different forms of rivalry across the stevia value chain.

Opportunities

Available industry reports consistently indicate growth in the global stevia market, although their market-size estimates and forecasts differ across publishers. For example, Grand View Research estimated the market at USD 513.4 million in 2023 and projected it to reach USD 1,122.7 million by 2030, whereas IMARC Group estimated the 2023 market at USD 763.0 million and forecast USD 1,438.3 million by 2032 (Grand View Research, 2023; IMARC Group, 2024). These estimates should be interpreted in light of differences in reporting periods, market definitions, and forecasting methodologies. Accordingly, Figure 3 presents the published estimates as separate projections rather than as a statistically unified market-size range.

Across the selected market reports, projected compound annual growth rates (CAGRs) indicate continued expansion of the global stevia market, although the estimated growth rates and forecast periods differ among publishers. Grand View Research reports a CAGR of 11.9% for 2024–2030, Data Bridge Market Research reports 9.85% for its forecast period, IMARC Group estimates 6.39% for 2026–2034, and Technavio reports 8.08% for 2024–2028. These differences should be interpreted in the context of each publisher's market definition, base year, forecast horizon, and estimation methodology. Overall, the available projections suggest a positive market growth outlook, although they do not by themselves establish that the market is unsaturated or identify the specific contribution of adoption rates, raw-material prices, or regulatory conditions to the differences in forecast growth.

This increase in demand aligns with a shift in consumer preferences toward low-sugar and natural-ingredient products, driven by concerns about obesity, diabetes, and other non-communicable diseases (Pangestika et al., 2025). On the policy side, restrictions on sugar consumption and taxes on sugar-sweetened beverages in a number of countries are prompting manufacturers to reformulate their products with alternative sweeteners (Dipinto & Setyowati, 2025). This creates opportunities for all participants in the value chain, from farmers and extract producers to end-user industries.

Commercial market estimates diverge substantially, but the figures refer to different base years, market definitions, and forecast horizons. They should therefore not be treated as the lower and upper bounds of a single comparable forecast interval. The graphic in Figure 3 is illustrative of the published estimates and does not establish a statistically unified projection.

Greater confidence would require harmonised definitions and independent verification of each forecast.

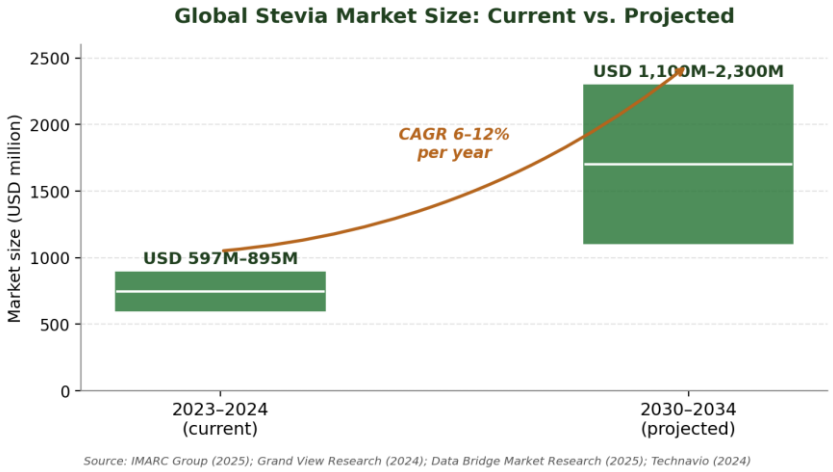

Figure 3. Global stevia market size, current (2023–2024) versus projected (2030–2034).
Source: IMARC Group; Grand View Research; Data Bridge Market Research; Technavio (as cited in the manuscript).

Several strategic opportunities emerge from this analysis: (1) the global trend toward health awareness and sugar-reduction policy is driving the reformulation of food and beverage products; (2) growth in the Asia-Pacific market is supported by a large diabetic population and a tradition of natural-ingredient consumption; (3) potential partnerships and improvements in domestic cultivation could strengthen upstream supply chains; and (4) fermentation technology for Rebaudioside M is gradually resolving the aftertaste problem, opening the way to broader, mainstream market penetration (Jiang et al., 2026).

Challenges

The industry also faces several important challenges. First, the threat of substitution remains high because consumers and manufacturers have access to a wide range of cheaper and more established natural and synthetic sweeteners. Second, stevia cultivation remains fragmented, with many small-scale farmers operating at relatively low productivity, which raises concerns about the consistency and stability of supply. Third, there is a clear power imbalance between smallholder farmers and producers on the one hand and large industrial buyers on the other, which can limit the bargaining position of smaller players along the value chain. Finally, consumer understanding of the safety and benefits of stevia remains uneven across market segments. This challenge may be particularly relevant for price-sensitive consumers, for whom the perceived premium price of stevia can constrain adoption. Evidence from East Java indicates that the adoption of stevia-based sweeteners is hindered by high prices and consumer perceptions, while product knowledge and health consciousness are important determinants of willingness to pay (Sholehah et al., 2026). In addition, research on Indonesian consumers suggests that price, product attributes, and health-related information are important considerations in the purchase intention for stevia-based sweeteners (Indrayani, Ghofar, et al., 2025).

Implications for Competitive Strategy

The Five Forces findings provide a basis for identifying strategic priorities across the stevia value chain. Competitive pressures and business challenges differ between cultivation, extraction and purification, and branding and marketing, so a single strategy is unlikely to be

equally effective for all industry participants. Figure 4 illustrates the three main segments of the value chain and the strategic implications for each: contract farming partnerships upstream, R&D to improve taste profiles midstream, and brand differentiation through health-oriented narratives downstream.

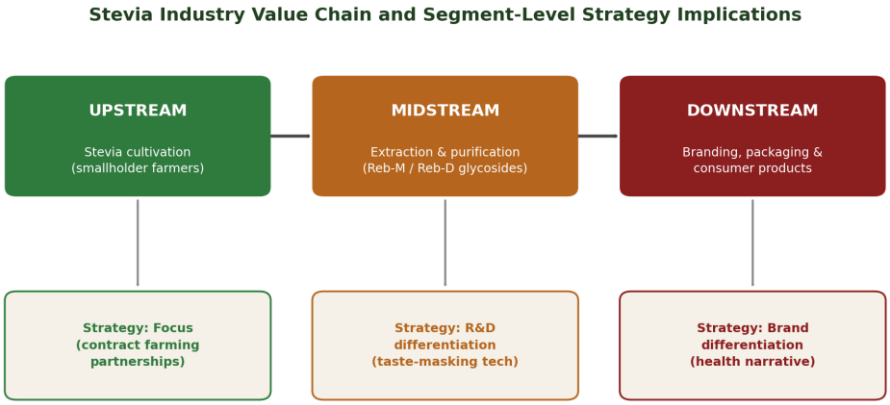

Figure 4. Stevia industry value chain and segment-level strategy implications.
Source: Illustration reproduced from the submitted research manuscript.

As Figure 4 shows, each segment requires a different strategic approach. Upstream, contract farming partnerships can strengthen coordination between smallholder farmers and downstream businesses while supporting more reliable supply and better production planning. In the midstream segment, investment in R&D is important for improving extraction and purification processes, particularly in developing steviol glycosides such as Rebaudioside M and Rebaudioside D with taste profiles closer to sugar. Downstream, brand differentiation through credible health-oriented narratives can help stevia products stand out in an increasingly competitive sweetener market and strengthen their appeal to health-conscious consumers. Table 4 links each strategy to the competitive pressure it addresses.

Table 4. Linking competitive pressures to segment-level strategies

Segment	Main competitive pressures	Strategic response	Expected effect
Upstream	Weak farmer bargaining position; supply fragmentation and uncertainty	Contract farming partnerships	More reliable supply and better production planning
Midstream	High buyer power; taste-related substitution; concentrated Reb-M technology	R&D on extraction and purification	Sugar-like taste profile; stronger technological position
Downstream	Many substitutes; price-sensitive consumers; rising rivalry	Brand differentiation through credible health-oriented narratives	Greater loyalty and lower price sensitivity

Source: Qualitative synthesis of the cited secondary literature.

Taken together, these strategies highlight the importance of coordination across the value chain rather than isolated interventions at individual stages. Stronger farmer–processor

partnerships, continued technological development, and effective consumer-oriented branding can complement one another in addressing supply constraints, product differentiation, and market competition. Their effectiveness, however, depends on implementation capacity, market conditions, and the ability of industry participants to collaborate along the value chain.

Discussion and Implications

The segment-level view refines the single-rating output of a conventional Five Forces analysis. A force that appears moderate at the industry level, such as supplier power (low–medium), conceals opposing positions at the farm gate and at the extract level (Table 3). This suggests that Five Forces assessments of agro-industrial value chains should be disaggregated by segment rather than reported as a single score.

The prominence of substitution threats and buyer pressure is consistent with firm-level evidence from the Indonesian stevia market, where competitive strategy, marketing effectiveness, and operational efficiency have been identified as important business concerns (Rasyid et al., 2025). The present industry-level analysis extends this perspective by examining how competitive pressures differ across the value chain, particularly in downstream markets and at the interface between processors and large industrial buyers. It further highlights a strategic tension: growing demand for sugar-reduction solutions creates market opportunities while also attracting new entrants and potentially intensifying competitive rivalry. Meanwhile, technological capabilities and regulatory compliance may create entry barriers in extraction and refining, although their protective effects require further assessment.

For policy makers, the analysis suggests that support for agricultural production alone is unlikely to resolve competitiveness problems in extraction, certification, and marketing. The cited Minister of Agriculture Regulation No. 47/Permentan/SR.310/11/2018 should not be treated as evidence of a dedicated stevia-development programme; the policy basis for stevia-specific support therefore requires separate verification. For firms, the more defensible implication is to align strategy with their actual position along the value chain, while recognising that product-specific regulatory requirements vary by ingredient and intended use.

Finally, the Five Forces framework describes industry structure at a point in time. It does not capture dynamic change or the role of complementary products and regulation, both of which matter here (for example, GRAS and BPOM approval and sugar-tax policies). These factors were therefore treated as drivers within the force assessments rather than as separate forces.

CONCLUSION

The qualitative assessment using Porter's Five Forces framework indicated that the stevia-based natural sweetener industry presented strategic opportunities driven by increasing demand for sugar alternatives while facing substantial competitive pressures. The bargaining power of buyers and the threat of substitutes were assessed as high, whereas the threat of new entrants and competitive rivalry were classified as medium to high. The bargaining power of suppliers varied across value-chain segments, particularly between stevia farmers and specialized steviol glycoside extract manufacturers. Technological requirements, product quality specifications, and access to distribution channels contributed to differences in barriers to entry across upstream, midstream, and downstream activities. These assessments were derived from a

qualitative synthesis of secondary evidence rather than direct quantitative measurements of market concentration, competitive intensity, or industry profitability. Accordingly, commercial market forecasts and claims concerning domestic regulatory support should be interpreted cautiously and evaluated against verifiable evidence.

Strategic priorities differed across the industry's value chain. Upstream stevia farmers could benefit from coordinated supply-chain partnerships and contract farming arrangements, while midstream extract manufacturers could strengthen their competitive positions through research and development focused on improving sweetness profiles, minimizing undesirable aftertastes, and enhancing extraction and purification capabilities. Downstream brands could pursue product differentiation supported by transparent product information, scientifically substantiated claims, and compliance with applicable food safety regulations. Nevertheless, the study was limited by its reliance on secondary data, incomplete documentation of source selection procedures, methodological differences among commercial market forecasts, and the absence of direct validation by industry stakeholders. Future research should incorporate comparable data on production costs, market prices, distribution structures, and stakeholder perspectives to examine variations in bargaining power across value-chain participants. Comparative studies across countries and more systematic multicriteria assessment approaches could further strengthen the empirical foundation of competitive analysis. Such investigations would improve the applicability of Porter's Five Forces framework to strategic decision-making and evidence-based policy development in the stevia industry.

FUNDING

This research does not receive any special funding support from government, private, or other organizations in the conduct of research and/or publication of this article.

CONFLICT OF INTEREST

This research was conducted without any commercial or financial relationship that could cause potential conflicts of interest.

AUTHOR CONTRIBUTION

The author is responsible for all stages of the research, including the conceptualization of the research, the preparation of the methodology, the search and selection of the literature, the analysis of the data, the interpretation of the results, the preparation of the manuscript, and the final revision of the article. The author has read and approved the final version of the manuscript for publication.

GENERATIVE ARTIFICIAL INTELLIGENCE USAGE STATEMENT

Generative Artificial Intelligence (AI) is not used to generate research data, conduct scientific analysis, or replace the author's intellectual contribution in the preparation of this manuscript. When used in the manuscript preparation process, AI is only used to a limited extent to help improve the language and structure of the writing. The author remains fully responsible for the accuracy, integrity, and final content of the manuscript.

REFERENCES

Anwar, S., Syed, Q. A., Munawar, F., Arshad, M., Ahmad, W., Rehman, M. A., & Arshad, M.

K. (2023). Inclusive overview of sweeteners trends: Nutritional safety and commercialization. *ACS Food Science & Technology, 3*(2), 245–258. https://doi.org/10.1021/acsfoodscitech.2c00325

Ashwell, M. (2015). Stevia, nature's zero-calorie sustainable sweetener: A new player in the fight against obesity. *Nutrition Today, 50*(3), 129–134. https://doi.org/10.1097/NT.0000000000000094

Assefa, T. T., Meuwissen, M. P. M., & Oude Lansink, A. G. J. M. (2015). Price volatility transmission in food supply chains: A literature review. *Agribusiness, 31*(1), 3–13. https://doi.org/10.1002/agr.21380

Daher, M., Fahd, C., Nour, A. A., & Sacre, Y. (2022). Trends and amounts of consumption of low-calorie sweeteners: A cross-sectional study. *Clinical Nutrition ESPEN, 48*, 427–433.

de Andrade, M. V. S., Lucho, S. R., de Castro, R. D., & Ribeiro, P. R. (2024). Alternative for natural sweeteners: Improving the use of stevia as a source of steviol glycosides. *Industrial Crops and Products, 208*, Article 117801. https://doi.org/10.1016/j.indcrop.2023.117801

Dipinto, R. N. P., & Setyowati, M. S. (2025). Studi kasus best practice pemungutan cukai atas minuman berpemanis dalam kemasan di Meksiko. *Owner: Riset dan Jurnal Akuntansi, 9*(1), 41–51. https://doi.org/10.33395/owner.v9i1.2543

Ensign, P. C. (2001). Value chain analysis and competitive advantage. *Journal of General Management, 27*(1), 18–42. https://doi.org/10.1177/030630700102700102

Grand View Research. (2023). *Stevia market size, share & trends analysis report by application (beverages, food, pharmaceutical, tabletop sweeteners), by region, and segment forecasts, 2024–2030*. https://www.grandviewresearch.com/industry-analysis/stevia-market

IMARC Group. (2024). *Stevia market report by extract type (powder, liquid, leaf), end use (beverages, food products, table top sweeteners, pharmaceuticals, and others), and region 2024–2032*. https://www.imarcgroup.com/stevia-market

Indrayani, R., Damayanti, E., Suwarman, H. R., & El-Hadi, R. M. (2025). *Stevia: Dari daun manis ke bisnis berkelanjutan*. CV Eureka Media Aksara. https://books.google.co.id/books?id=t72YEQAAQBAJ

Indrayani, R., Ghofar, K. A., Adjani, K., Koesindratmono, F., & Damayanti, S. E. (2025). Integration of consumer perception in marketing strategy formulation of stevia based natural sweetener products. In *Proceedings of the Bakrie International Conference on Communication, Management, Politics & Accounting (BICOMPACT) 2025*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5882062

Jiang, L., Zhao, X., Li, W., Tang, G., Yuan, Y., Cheng, J., Hua, J., & Zou, L. (2026). A comprehensive review on steviol glycosides: Sources, properties, bioactivities, sensory-functional enhancement and bioproduction strategies. *Plants, 15*(2), Article 324. https://doi.org/10.3390/plants15020324

Kamarulzaman, N. H., Jamal, K., Vijayan, G., & Ab. Jalil, S. M. (2014). Will consumers purchase stevia as a sugar substitute?: An exploratory study on consumer acceptance. *Journal of Food Products Marketing, 20*(sup1), 122–139. https://doi.org/10.1080/10454446.2014.921877

Li, Y., Zhu, W., Cai, J., Liu, W., Akihisa, T., Li, W., Kikuchi, T., Xu, J., Feng, F., & Zhang, J. (2021). The role of metabolites of steviol glycosides and their glucosylated derivatives against diabetes-related metabolic disorders. *Food & Function, 12*(18), 8248–8259. https://doi.org/10.1039/d1fo01370j

Pangarkar, N., & Prabhudesai, R. (2024). Using Porter's five forces analysis to drive strategy. *Global Business and Organizational Excellence, 43*(5), 24–34. https://doi.org/10.1002/joe.22250

Pangestika, W., Amaliah, L., Masrikhiyah, R., Salsabila, A. P., Mustikaningrum, A. C., Nafilah, N., Rachma, D. E., & Wahyuningtyas, A. P. (2025). Inovasi pangan fungsional lokal: Strategi pasar dan bisnis berkelanjutan (studi kasus Universitas Sultan Ageng Tirtayasa). *Jurnal Bisnis & Kewirausahaan, 21*(3), 165–175. https://doi.org/10.31940/jbk.v21i3.165-175

Pérez, E., González, C., Vaillant, F., & Lares, M. (2016). Stevia derivative and its potential uses in diabetic-directed foods: Review. *Journal of Nutrients, 3*(1), 1–20. https://doi.org/10.18488/journal.87/2016.3.1/87.1.1.20

Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors*. Free Press.

Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance*. Free Press.

Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review, 86*(1), 78–93.

Putri, T. W., Suryantini, A., & Utami, A. W. (2019). The competitiveness of *Stevia rebaudiana* as a sweetener alternative in Tawangmangu Subdistrict of Karanganyar Regency. *Agro Ekonomi, 30*(1), 78–93. https://doi.org/10.22146/ae.46979

Rahman, M. M., Farhana, Z., Al Noman, A., Hossain, N., Kamil, A. A., & Riaz, B. K. (2025). Burden of hypertension, diabetes, and hypercholesterolemia in relation to social and behavioral health determinants: Insights from the 2018 Bangladesh STEPS survey. *Public Health, 246*, Article 105832. https://doi.org/10.1016/j.puhe.2025.105832

Rasyid, M. A., Akbar, F., Fahrirrijal, I., & Bachtiar, E. B. (2025). Penerapan Porter Five Forces dan analisis SWOT dalam perencanaan strategi PT Sweet on Stevia. *Moneter: Jurnal Ekonomi dan Keuangan, 3*(2). https://doi.org/10.61132/moneter.v3i2.1292

Sholehah, N. L., Maulidah, S., & Isaskar, R. (2026). Economic valuation of stevia sweetener: Double-bounded dichotomous choice study in East Java. *Jurnal Manajemen & Agribisnis, 23*(1). https://doi.org/10.17358/jma.23.1.1